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# SNOW SURVEY and WATER SUPPLY FORECASTS for MONTANA & NORTHERN WYOMING

UNITED STATES DEPARTMENT of AGRICULTURE···SOIL CONSERVATION SERVICE.
and
MONTANA AGRICULTURAL EXPERIMENT STATION

Data included in this report were obtained by the agencies named above in cooperation with the Bureau of Reclamation, U.S. Forest Service, U.S. Geological Survey, National Park Service, State Engineers of Montana and Wyoming and other Federal, State, and private organizations.

AS OF
**MAR. 1, 1961**

USDA SCS LINCOLN, NEBR. 1961

# UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

*To Recipients of Cooperative Snow Survey and Water Supply Forecast Reports:*

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Fortunately, most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from fore-knowledge of the runoff.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, about 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

By relating snow survey measurements taken over a period of years to spring-summer runoff during the same period, relationships have been developed which make it possible to forecast seasonal runoff several months in advance of occurrence. In order to make a forecast, once a forecast relationship has been developed, the maximum snow water content at previously selected key snow courses is usually entered in the forecast relationship. More accurate forecasts are often obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast relationships.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions.

## PUBLISHED BY SOIL CONSERVATION SERVICE

| REPORTS | ISSUED | LOCATION | COOPERATING WITH |
|---|---|---|---|
| **RIVER BASINS** | | | |
| Colorado and State of Utah | Monthly (Jan.-May) | Salt Lake City, Utah | Utah State Engineer and Other Agencies |
| Columbia | Monthly (Jan.-May) | Boise, Idaho | Idaho State Reclamation Engineer |
| Upper Missouri and State of Montana | Monthly (Feb.-May) | Bozeman Montana | Mont. Agr. Exp. Station |
| West-Wide | Oct. 1, Apr. 1, May 1 | Portland, Oregon | All Cooperators |
| **STATES** | | | |
| Alaska | Monthly (Mar.-May) | Palmer, Alaska | Alaska S.C.D. |
| Arizona | Semi-Monthly (Jan.15 - Apr.1) | Phoenix, Arizona | Salt R. Valley Water Users Assoc.<br>Ariz. Agr. Exp. Station |
| Colorado and New Mexico | Monthly (Feb.-May) | Fort Collins, Colorado | Colo. Agr. Exp. Station<br>Colo. State Engineer<br>N. Mex. State Engineer |
| Idaho | Monthly (Feb.-May) | Boise, Idaho | Idaho State Reclamation Engineer |
| Nevada | Monthly (Feb.-Apr.) | Reno, Nevaoa | Nevada Dept. of Conservation and Natural Resources<br>Division of Water Resources |
| Oregon | Monthly (Jan.-May) | Portland, Oregon | Ore. Agr. Exp. Station<br>Oregon State Engineer |
| Washington | Monthly (Feb.-May) | Spokane, Washington | Wn. State Dept. of Conservation |
| Wyoming | Monthly (Feb. June) | Casper, Wyoming | Wyoming State Engineer |

*Copies of these various reports may be secured from:* Head, Water Supply Forecasting Section
Soil Conservation Service
209 S. W. Fifth Ave., Portland 4, Oregon

## PUBLISHED BY OTHER AGENCIES

| REPORTS | ISSUED | AGENCY |
|---|---|---|
| British Columbia | Monthly (Feb.-June) | Comptroller, Water Rights Br., Dept. of Lands and Forests, Parliament Bldg., Victoria, B.C., Canada |
| California | Monthly (Feb.-May) | Calif. Dept. of Water Resources, Sacramento, Calif. |

# FEDERAL-STATE-PRIVATE COOPERATIVE

# SNOW SURVEYS and WATER SUPPLY FORECASTS

# For

# MONTANA AND NORTHERN WYOMING

# (Upper Missouri and Upper Columbia River Basins)

Report Prepared
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| Lower Clark Fork | Watershed | III |
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| Bitterroot | Watershed | V |
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MONTANA
WATER SUPPLY OUTLOOK
as of
March 1, 1961

* * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                       *
* The 1961 Water Supply Outlook on March first appears  *
* to be slightly better than it was on February first.  *
*                                                       *
* The far northwest corner of the State looks good. A   *
* gradual decline in percentage of averages is indicated *
* along the Continental Divide to the southeast, where  *
* the water supply outlook is POOR.                     *
*                                                       *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * *

IRRIGATION WATER SUPPLY

The apparent shortage of irrigation water for this season is a reminder to plan crops that mature early, plant acreages that are economical on water use, and irrigate wisely. Suggested cropping and farm planning for a short water supply are indicated in the individual Watershed forecasts.

SNOW COVER

The snow cover in the low elevations is practically gone, so far as runoff is concerned. March first snow surveys in the Kootenai indicate that the present winter pack is 134 percent of last year and 110 percent of normal. Over the Flathead basin the pack is 90 percent of last season and 84 percent average. The Bitterroot basin surveys show 112 percent of last season, but only 75 percent average. The Clark Fork River headwaters is covered with a pack that is 72 percent of last year, which is only 63 percent average.

On the East side of the Continental Divide, March first surveys in the Beaverhead indicate 82 percent of last season's pack and 62 percent average. The Madison and Gallatin basins snow-pack has improved to 120 percent of last year, or 78 percent average. These basins are bright spots on the Missouri. The Yellowstone Park snow-pack also increased during February to 116 percent of last year, or 77 percent average. The Musselshell basin is covered with a snow-pack that is 53 percent of last year and 51 percent average.

## PRECIPITATION

Precipitation at valley stations on the Missouri basin shows a below normal reading. A good portion of the Columbia basin is below normal, except in the extreme northwest corner of the State.

## SOIL MOISTURE

Soil moisture is extremely low in the sub-soils throughout the State. These dry soils will use more water from the snow-pack, which will result in a dimished supply for irrigation.

## WINTER STREAMFLOW CONDITIONS

West of the Continental Divide surface streamflow has been considerably above median, in the range of 141 to 173 percent. East of the Divide, flows are generally close to median in the north and dimish sharply to 65 and 7 percent median in the southern, central and eastern portions of the State.

## IRRIGATION RESERVOIR STORAGE

Irrigation reservoirs show a slight gain, but at present are below average for the first of March. Indications are that a critical area may be noted on the Red Rock River above Lima, where the snow-pack is about 50 percent average and is forecast to flow 43 percent average for the runoff season, May-September.

## PRESENT WATER SUPPLY OUTLOOK

Streamflow forecasts prepared for March first are all below average--ranging from 98 percent on the Kootenai and Flathead down to 52 percent on the Upper Clark Fork, 68 percent on the Jefferson, and 60 percent on the Musselshell. Detail figures of volume forecast, percent average and comparison of forecasts with last year's flow are shown on the individual forecast sheets for each Watershed in this bulletin.

Revised forecasts will be prepared for the April and May bulletins.

# UPPER MISSOURI RIVER BASIN
# SNOW SURVEY COURSES
# IN
# MONTANA & NORTHERN WYOMING

**LEGEND**

- ○ TOWNS AND CITIES
- ● 13D4 SNOW SURVEY COURSE
- ○ 9G1 IDAHO & WYOMING NUMBERS
- ▲ STREAM GAGING STATIONS

1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE
BOZEMAN MONTANA

SCALE IN MILES 50 25 0 50 100

I KOOTENAI
II FLATHEAD
III CLARK FORK
IV BITTERROOT
V HOLE IN THE GROUND
VI MARIAS
VII MUSSELSHELL
VIII BEAVERHEAD
IX MADISON
X UPPER MISSOURI
XI UPPER YELLOWSTONE

ST. MARY
MILK
TETON
SUN
BLACKFOOT
BIG HOLE
JEFFERSON
GALLATIN
RUBY
YELLOWSTONE
LOWER YELLOWSTONE
SHOSHONE
GREYBULL
BIG HORN
WIND
POPO AGIE
NOWOOD
TONGUE
POWDER

IDAHO
MONTANA
WYOMING
SOUTH DAKOTA

KOOTENAI LAKE
FLATHEAD LAKE
FORT PECK RESERVOIR

KERON
LIBBY
THOMPSON FALLS
PLAINS
POLSON
KALISPELL
COLUMBIA FALLS
SHELBY
HAVRE
GLASGOW
CHOTEAU
AUGUSTA
GREAT FALLS
LEWISTOWN
OVANDO
MISSOULA
HAMILTON
DARBY
ANACONDA
BUTTE
HELENA
BOZEMAN
WILSALL
LIVINGSTON
HARLOWTON
BILLINGS
MILES CITY
DILLON
CORWIN SPRINGS
RED LODGE
CODY
MEETEETSE
WORLAND
THERMOPOLIS
RIVERTON
LANDER
SHERIDAN
ARVADA
BUFFALO
KAYCEE
SHELL
OUBOIS

# INDEX TO MONTANA & NORTHERN WYOMING SNOW COURSES

| Drainage Basin and Course Name | Montana Number | Elev. | Location Sec. Lat. | Twp. | Range Long. | Record Began | Measuring Dates | Measured By |
|---|---|---|---|---|---|---|---|---|
| **JEFFERSON RIVER** | | | **MISSOURI RIVER DRAINAGE** | | | | | |
| (ROCK-BEAVERHEAD) | | | | | | | | |
| Lakeview Ridge | 11E3 | 7400 | 27 | 14S | 2W | 1948 | 3,4,5 | 10 |
| Lakeview Canyon | 11E4 | 6939 | 26 | 14S | 2W | 1948 | 3,4,5 | 10 |
| Limekiln | 12E2 | 6950 | 5 | 15S | 9W | 1948 | 3,4 | 1 |
| White Pine Ridge | 12E1 | 8850 | 18 | 14S | 9W | 1948 | 3,4 | 1 |
| (HORSE PRAIRIE) | | | | | | | | |
| Bloody Dick | 13D10 | 7600 | 12 | 8S | 16W | 1948 | 3,4 | 1 |
| Cold Stone | 13D9 | 8100 | 11 | 8S | 16W | 1948 | 3,4 | 1 |
| Lemhi Pass | 13E1 | 7480 | 9 | 10S | 15W | 1948 | 3,4 | 1 |
| Terrell Creek | 13D12 | 6650 | 14 | 9S | 15W | 1948 | 3,4 | 1 |
| Trail Creek | 13E2 | 7090 | 15 | 10S | 15W | 1948 | 3,4 | 1 |
| Jelway Junction | 13D11 | 6800 | 27 | 8S | 15W | 1948 | 3,4 | 1 |
| (BIG HOLE) | | | | | | | | |
| Big Hole Pass | 13D3 | 7240 | 28 | 3S | 18W | 1948 | 3,4 | 1 |
| Big Hole Pass-Be. | 13D4 | 6900 | 24 | 3S | 18W | 1948 | 3,4 | 1 |
| East Boundary | 13D5 | 6700 | 22 | 3S | 17W | 1948 | 3,4 | 1 |
| Gibbons Pass | 13D2 | 7100 | 4 | 2S | 19W | 1934 | 1,2,3,4,5 | 1,3 |
| Jahnke Creek | 13D8 | 7340 | 25 | 7S | 16W | 1948 | 3,4 | 1 |
| Miner Forke | 13D6 | 7300 | 24 | 6S | 17W | 1948 | 3,4 | 1 |
| Miner Lake | 13D7 | 6720 | 10 | 6S | 16W | 1945 | 3,4,5 | 1 |
| (WISE RIVER) | | | | | | | | |
| Anderson Mdw. | 13D14 | 7000 | 18 | 3S | 12W | 1948 | 3,4 | 1 |
| Elk Horn | 13D15 | 8450 | 15 | 4S | 12W | 1935 | 3,4,5 | 3 |
| Wise River | 13D13 | 6300 | 15 | 2S | 12W | 1948 | 3,4 | 1 |
| (RUBY RIVER) | | | | | | | | |
| Flashlight | 12D3 | 6950 | 22 | 8S | 7W | 1945 | 3,4,5 | 1 |
| MADISON RIVER | | | | | | | | |
| Hebgen | 11E5 | 6550 | 22 | 11S | 3E | 1934 | 1,2,3,4,5 | 3 |
| West Yellowstone | 11E7 | 6700 | 34 | 13S | 5E | 1934 | 1,2,3,4,5 | 3 |
| Norris Basin | 10E2 | 7500 | 44°44' | | 110°-42' | 1936 | 3,4 | 6 |
| GALLATIN RIVER | | | | | | | | |
| Hood Meadow | 10D3 | 6600 | 22 | 4S | 6E | 1935 | 2,3,4,5 | 2,1 |
| New World | 10D1 | 6700 | 24 | 3S | 6E | 1939 | 1,2,3,4,5 | 7 |
| 21-Mile | 11E6 | 7150 | 1 | 11S | 5E | 1934 | 1,2,3,4,5 | 3 |
| MISSOURI RIVER MAIN STEM | | | | | | | | |
| Cheesman Reservoir | 12C5 | 6200 | 2 | 8N | 5W | 1936 | 1,2,3,4,5 | 3 |
| Crystal Lake | 9C1 | 6100 | 19 | 12N | 18E | 1941 | 3,4 | 1,2 |
| Grasshopper | 10C2 | 7000 | 19 | 9N | 8E | 1938 | 3,4 | 2 |
| Kings Hill | 10C1 | 7950 | 35 | 13N | 7E | 1934 | 3,4,5 | 3 |
| Picnic Grounds | 12C6 | 6500 | 10 | 5N | 6W | 1941 | 2,3,4 | 4 |
| Pipestone Pass | 12D1 | 7200 | 10 | 1N | 7W | 1938 | 2,3,4,5 | 1 |
| Stemple Pass | 12C1 | 6900 | 16 | 13N | 7W | 1934 | 3,4,5 | 3 |
| Ten Mile Creek L | 12C2 | 6250 | 13 | 8N | 6W | 1935 | 1,2,3,4,5 | 3 |
| Ten Mile Creek M | 12C3 | 6800 | 13 | 8N | 6W | 1934 | 1,2,3,4,5 | 3 |
| Ten Mile Creek U | 12C4 | 8000 | 19 | 8N | 5W | 1935 | 1,2,3,4,5 | 3 |
| (TETON RIVER) | | | | | | | | |
| Freight Creek | 12A1 | 6000 | 13 | 26N | 10W | 1948 | 3,4 | 1 |
| Waldron Creek | 12B2 | 5600 | 16 | 25N | 9W | 1948 | 3,4 | 1 |
| West Fork | 12B1 | 6000 | 6 | 25N | 9W | 1948 | 3,4 | 1 |
| (SUN RIVER) | | | | | | | | |
| Benchmark | 12B8 | 5500 | 9 | 20N | 10W | 1948 | 3,4 | 1 |
| Cabin Creek | 12B6 | 5400 | 33 | 23N | 10W | 1949 | 3,4 | 1,2 |
| S-Bull | 12B9 | 5600 | 36 | 20N | 10W | 1948 | 3,4 | 1,2 |
| Oates Park | 12B5 | 5300 | 31 | 24N | 10W | 1949 | 3,4 | 1,2 |
| Goat Mountain | 12B7 | 7000 | 20 | 22N | 10W | 1934 | 3,4 | 3 |
| Wrong Ridge | 12B3 | 6800 | 17 | 25N | 10W | 1949 | 3,4 | 1,2 |
| Wrong Creek | 12B4 | 5700 | 32 | 25N | 10W | 1949 | 3,4 | 1,2 |
| (MARIAS RIVER) | | | | | | | | |
| Marias Pass | 13A5M | 5250 | 34 | 30N | 14W | 1934 | 1,2,3,4,5 | 3 |
| (MILK RIVER) | | | | | | | | |
| Rocky Boy | 9A1 | 5200 | 15 | 28N | 16E | 1941 | 3,4 | 7 |
| (MUSSELSHELL RIVER) | | | | | | | | |
| Grasshopper | 10C2 | 7000 | 19 | 9N | 8E | 1938 | 3,4 | 2 |

| Drainage Basin and Course Name | Montana Number | Elev. | Location Sec. Lat. | Twp. | Range Long. | Record Began | Measuring Dates | Measured By |
|---|---|---|---|---|---|---|---|---|
| **MISSOURI RIVER DRAINAGE (cont.)** | | | | | | | | |
| (UPPER YELLOWSTONE) | | | | | | | | |
| Camp Senia | 9D1 | 7890 | 2 | 8S | 18E | 1937 | 4 | 1 |
| Canyon | 10E3 | 7750 | 44°-44' | | 110°-30' | 1938 | 1,2,3,4,5 | 6 |
| Cooke City | 10D7 | 7400 | 25 | 9S | 14E | 1937 | 1,2,3,4,5 | 6 |
| Crevice Mt. | 10D5 | 8400 | 22 | 9S | 9E | 1935 | 3,4 | 2 |
| Independence | 10D6 | 8000 | 22 | 7S | 12E | 1940 | 3,4 | 1 |
| Lake Camp | 10E4 | 7850 | 44°-34' | | 110°-24' | 1936 | 1,2,3,4,5 | 6 |
| Lupine Creek | 10E1 | 7300 | 44°-54' | | 110°-37' | 1938 | 1,2,3,4,5 | 6 |
| Lodgepole | 9E1 | 8200 | 32 | 5&6N | 106W | 1940 | 2,3,4,5 | 1,4 |
| West Fosebud | 9D2 | 7500 | 10 | 7S | 16E | 1940 | 1,2,3,4,5 | 4 |
| (SNIELDS RIVER) | | | | | | | | |
| Porcupine | 10C3 | 6500 | 10 | 4N | 10E | 1938 | 3,4 | 1 |
| LOWER YELLOWSTONE | | | | | | | | |
| (WIND RIVER) Wyoming | | | | | | | | |
| Big Warm | 9F12 | 8800 | 36 | 42N | 109W | 1955 | 2,3,4,5 | 1 |
| Brooke Lake #3 | 10P8 | 9200 | 23 | 44N | 110W | 1939 | 2,3,4,5 | 1 |
| Burroughs Creek | 9F4 | 8800 | 15 | 43N | 107W | 1948 | 2,3,4,5 | 1 |
| Dinwoodie | 9F10 | 10000 | 21 | 39N | 105W | 1948 | 2,3,4,5 | 1 |
| Dry Creek | 9F9 | 9500 | 34 | 4N | 6W | 1948 | 2,3,4,5 | 1 |
| DuNoir | 9F6 | 8750 | 27 | 42N | 108W | 1940 | 2,3,4,5 | 1 |
| East Fork | 9F13 | 9200 | 23 | 44N | 104W | 1956 | 2,3,4,5 | 1 |
| Geyser Creek | 9F7 | 8500 | 12 | 41N | 108W | 1948 | 2,3,4,5 | 1 |
| Little Warm | 9F8 | 9500 | 24 | 41N | 108W | 1948 | 2,3,4,5 | 1 |
| Sheridan R.S. #1 | 9F5 | 7500 | 3 | 42N | 109W | 1939 | 2,3,4,5 | 1 |
| Sheridan R.S. #2 | 9F14 | 7500 | 3 | 42N | 109W | 1955 | 2,3,4,5 | 1 |
| T-Cross Ranch | 9F3 | 8000 | 1 | 43N | 107W | 1940 | 2,3,4,5 | 1 |
| Togwotee Pase | 10F9 | 9600 | 29 | 44N | 110W | 1936 | 2,3,4,5 | 11 |
| (POPO AGIE RIVER) Wyoming | | | | | | | | |
| Blue Ridge | 802 | 9500 | 23 | 31N | 101W | 1939 | 2,3,4,5 | 1 |
| Bruce's Camp | 805 | 6500 | 24 | 32N | 101W | 1955 | 2,3,4 | 1 |
| Hobb's Park | 903 | 10000 | 22 | 2S | 3W | 1948 | 2,3,4,5 | 1 |
| Mosquito Park R.S. | 904 | 9500 | 23 | 2S | 3W | 1940 | 2,3,4,5 | 1 |
| Sawmill Olade | 801 | 8500 | 3 | 31N | 101W | 1939 | 2,3,4,5 | 1 |
| South Pass | 803 | 9000 | 13 | 30N | 101W | 1939 | 2,3,4,5 | 1 |
| St. Lawrence | 9F11 | 9000 | 26 | 1N | 4W | 1940 | 2,3,4,5 | 1 |
| Trout Creek | 902 | 8400 | 5 | 2S | 2W | 1948 | 2,3,4,5 | 1 |
| (OWL CREEK) Wyoming | | | | | | | | |
| Beavere Mill | 9F2 | 8900 | 6 | 43N | 102W | 1948 | 2,3,4,5 | 1 |
| Owl Creek | 8F1 | 8700 | 36 | 43N | 101W | 1948 | 2,3,4,5 | 1 |
| (GREYBULL RIVER) Wyoming | | | | | | | | |
| Timber Creek #1 | 9E2 | 8800 | 25- | 47N | 103W | 1948 | 2,3,4,5 | 1 |
| Timber Creek #2 | 9E3 | 8800 | 25 | 47N | 103W | 1955 | 2,3,4,5 | 1 |
| Wood River #1 | 9F1 | 8000 | 28 | 46N | 103W | 1939 | 2,3,4,5 | 1 |
| Wood River #2 | 9F15 | 8000 | 28 | 46N | 103W | 1956 | 2,3,4,5 | 1 |
| (SNOSNONE RIVER) Wyoming | | | | | | | | |
| East Entrance | 10E6 | 7000 | 17 | 52N | 109W | 1948 | 1,2,3,4,5 | 6 |
| Sylvan Pass | 10E5 | 7100 | 12 | 52N | 110W | 1936 | 1,2,3,4,5 | 6 |
| (NOWOOD CREEK) Wyoming | | | | | | | | |
| Cold Springs Camp | 7E25 | 8700 | 1 | 50N | 88W | 1956 | 2,3,4,5 | 1 |
| Medicine Lodge Lks | 7E24 | 9500 | 7 | 51N | 87W | 1956 | 2,3,4,5 | 1 |
| Munkers Pass | 7E8 | 9700 | 11 | 48N | 85W | 1950 | 2,3,4,5 | 1 |
| North Powder | 7E36 | 8300 | 20 | 47N | 85W | 1956 | 2,3,4,5 | 1 |
| Onion Gulch | 7E27 | 8100 | 31 | 48N | 85W | 1956 | 2,3,4,5 | 1 |
| Tensleop Lake | 7E26 | 9075 | 33 | 50N | 86W | 1956 | 2,3,4,5 | 1 |
| Tensleep R.S. | 7E7 | 8300 | 30 | 49N | 86W | 1935 | 2,3,4,5 | 1 |
| Tyrell R.S. | 7E35 | 8300 | 30 | 49N | 86W | 1956 | 2,3,4,5 | 1 |
| (SHELL CREEK) Wyoming | | | | | | | | |
| Bald Mountain | 7E21 | 9600 | 33 | 56N | 91W | 1956 | 2,3,4,5 | 1 |
| Beaver-Tongue Div. | 7E20 | 9200 | 12 | 55N | 91W | 1956 | 2,3,4,5 | 1 |
| Bone-Spring Div. | 7E18 | 9200 | 32 | 55N | 89W | 1956 | 2,3,4,5 | 1 |
| Granite Creek Camp | 7E22 | 7800 | 15 | 53N | 89W | 1956 | 2,3,4,5 | 1 |
| Granite Pass | 7E17 | 8950 | 19 | 54N | 88W | 1956 | 2,3,4,5 | 1 |
| Norse-Trail Div. | 7E19 | 9200 | 29 | 55N | 90W | 1956 | 2,3,4,5 | 1 |
| Ranger Creek | 7E4 | 8800 | 32 | 53N | 88W | 1935 | 2,3,4,5 | 1 |
| Shell Creek | 7E23 | 9600 | 12 | 52N | 88W | 1956 | 2,3,4,5 | 1 |
| (PORCUPINE CREEK) Wyoming | | | | | | | | |
| Five Spgs. Falls | 7E31 | 7500 | 19 | 56N | 92W | 1956 | 2,3,4,5 | 1 |
| Medicine Wheel | 7E30 | 9000 | 24 | 56N | 92W | 1956 | 2,3,4,5 | 1 |
| (TONGUE RIVER) Wyoming | | | | | | | | |
| Beaver Tongue Div. | 7E20 | 9200 | 12 | 55N | 91W | 1956 | 2,3,4,5 | 1 |
| Big Goose #1 | 7E2 | 7700 | 4 | 53N | 86W | 1935 | 2,3,4,5 | 1 |
| Big Goose #2 | 7E32 | 7700 | 4 | 53N | 86W | 1955 | 2,3,4,5 | 1 |
| Bone-Spring Div. | 7E18 | 9200 | 32 | 55N | 89W | 1956 | 2,3,4,5 | 1 |
| Burgess R.S. #1 | 7E1 | 7900 | 36 | 56N | 89W | 1950 | 2,3,4,5 | 1 |
| Burgess R.S. #2 | 7E33 | 7900 | 36 | 56N | 89W | 1955 | 2,3,4,5 | 1 |
| Dome Lake #1 | 7E3 | 8800 | 11 | 53N | 87W | 1950 | 2,3,4,5 | 1 |
| Dome Lake #2 | 7E34 | 8800 | 11 | 53N | 87W | 1950 | 2,3,4,5 | 1 |
| Gloom Creek | 7E14 | 9300 | 32 | 55N | 87W | 1956 | 2,3,4,5 | 1 |
| Granite Pass | 7E17 | 8950 | 19 | 54N | 88W | 1956 | 2,3,4,5 | 1 |

| Drainage Basin and Course Name | Montana Number | Elev. | Location Sec. Lat. | Twp. | Range Long. | Record Began | Measuring Dates | Measured By |
|---|---|---|---|---|---|---|---|---|
| **MISSOURI RIVER DRAINAGE (cont.)** | | | | | | | | |
| (TONGUE RIVER cont.) | | | | | | | | |
| Horse Trail Div. | 7E19 | 9200 | 29 | 55N | 90W | 1956 | 2,3,4,5 | 1 |
| Lake Geneva | 7E16 | 9000 | 7 | 52N | 86W | 1956 | 2,3,4,5 | 1 |
| North Tongue | 7E15 | 8800 | 17 | 55N | 89W | 1956 | 2,3,4,5 | 1 |
| Sibley Lake | 7E11 | 8000 | 10 | 55N | 88W | 1956 | 2,3,4,5 | 1 |
| Sucker Creek | 7E12 | 9000 | 19 | 55N | 87W | 1956 | 2,3,4,5 | 1 |
| Steamboat Point | 7E10 | 7500 | 32 | 56N | 87W | 1956 | 2,3,4,5 | 1 |
| Wood Rock G.S. | 7E13 | 8500 | 3 | 54N | 88W | 1956 | 2,3,4,5 | 1 |
| (POWDER RIVER) Wyoming | | | | | | | | |
| Crazy Woman | 6E2 | 8200 | 6 | 47N | 84W | 1956 | 2,3,4,5 | 1 |
| Muddy Creek G.S. | 6E1 | 7800 | 2 | 48N | 84W | 1956 | 2,3,4,5 | 1 |
| Munkers Pass | 7E8 | 9700 | 11 | 48N | 85W | 1950 | 2,3,4,5 | 1 |
| North Powder #2 | 7E36 | 8300 | 20 | 47N | 85W | 1956 | 2,3,4,5 | 1 |
| Onion Gulch | 7E27 | 8100 | 31 | 48N | 85W | 1956 | 2,3,4,5 | 1 |
| Soldier Park | 7E5 | 8700 | 36 | 51N | 85W | 1950 | 2,3,4,5 | 1 |
| Sour Dough | 7E6 | 8500 | 17 | 49N | 84W | 1936 | 2,3,4,5 | 1 |
| **COLUMBIA RIVER BASIN** | | | | | | | | |
| KOOTENAI RIVER | | | | | | | | |
| Baree Creek | 15B11 | 5500 | 6 | 25N | 30W | 1956 | 4,5,5½ | 2 |
| Baree Mountain | 15B1 | 6000 | 1 | 25N | 31W | 1937 | 4,5,5½ | 2 |
| Red Mountain | 15A1 | 6000 | 4 | 36N | 29W | 1937 | 3,4,5,5½ | 1,2 |
| Weasel Divide | 14A7 | 5450 | 8 | 37N | 24W | 1955 | 4,5,5½ | 1,2 |
| FLATHEAD RIVER | | | | | | | | |
| Basin Creek | 13B11A | 5000 | 11 | 19N | 12W | 1951 | 2,3,4,5 | 2 |
| Big Creek | 13B3 | 6750 | 6&7 | 22N | 18W | 1941 | 3,4,5 | 5 |
| Brush Creek | 14A4 | 5000 | 13 | 30N | 26W | 1937 | 3,4,5 | 1,2 |
| Cattle Queen | 13A1 | 4700 | 7 | 35N | 17W | 1939 | 3,4,5 | 6 |
| Desert Mountain | 13A2M | 5600 | 24 | 31N | 19W | 1937 | 1,2,3,4,5 | 1,2 |
| Nell Roaring Div. | 14A3 | 5770 | 35 | 32N | 22W | 1942 | 3,4,5 | 1,2 |
| Nolbrook | 13B13A | 4530 | 18 | 21N | 13W | 1951 | 1,2,3,4,5 | 2 |
| Kishenehn | 14A6 | 3886 | 14 | 37N | 22W | 1954 | 4,5 | 6 |
| Logan Creek | 14A5 | 4300 | 34 | 30N | 24W | 1937 | 3,4,5 | 2 |
| Marias Pass | 13A5M | 5250 | 34 | 30N | 14W | 1934 | 1,2,3,4,5 | 3 |
| Mineral Creek | 13A16 | 4000 | 29 | 35N | 17W | 1957 | 3,4,5 | 6 |
| Quintonkon | 13A13 | 3800 | 11 | 26N | 17W | 1951 | 2,3,4,5 | 1,2 |
| Spotted Bear Mt. | 13B2M | 7000 | 23 | 25N | 15W | 1948 | 3,4,5 | 1,2 |
| Strawberry Lake | 13A10 | 6500 | 11 | 28N | 19W | 1948 | 3,4,5 | 2 |
| Trinkus Lake | 13B1 | 6500 | 9 | 25N | 17W | 1948 | 3,4,5 | 2 |
| Trout Lake | 13A12M | 3600 | 21 | 28N | 17W | 1948 | 3,4,5 | 1,2 |
| Twin Creeks | 13B11 | 3580 | 14 | 26N | 16W | 1951 | 2,3,4,5 | 1,2 |
| Upper Holland Lk. | 13B5 | 7000 | 28 | 20N | 16W | 1948 | 3,4,5 | 2 |
| CLARK FORK | | | | | | | | |
| Baree Creek | 15B11 | 5500 | 6 | 25N | 30W | 1956 | 4,5,5½ | 2 |
| Baree Mountain | 15B1 | 6000 | 1 | 25N | 31W | 1937 | 4,5,5½ | 2 |
| Black Pine | 13C13 | 7100 | 25 | 8N | 15W | 1960 | 3,4,5 | 1 |
| Coyote Hill | 13B10 | 4200 | 12 | 18N | 16W | 1952 | 1,2,3,4,5 | 2 |
| El Dorado Mine | 13C9 | 7800 | 23 | 8N | 12W | 1949 | 4 | 1 |
| Fred Burr Pass | 13C11 | 8000 | 12 | 6N | 13W | 1957 | 3,4,5 | 1 |
| Freezeout Summit | 15B10 | 6800 | 21 | 15N | 27W | 1937 | 4,5 | 2 |
| Gold Creek Lk. | 13C10 | 7200 | 14 | 8N | 12W | 1949 | 4 | 1 |
| Noodoo Creek | 15C1 | 6200 | 9 | 14N | 27W | 1937 | 4,5 | 2 |
| Intergaard | 13C4 | 6450 | 6 | 5N | 13W | 1936 | 2,3,4 | 4 |
| Lubrecht Forest #6 | 13C8 | 4400 | 11 | 14N | 15W | 1951 | 1,2,3,4,5 | 12 |
| North Fork Jocko | 13B7 | 6330 | 3 | 17N | 17W | 1941 | 3,4,5 | 5 |
| Pipestone Pass | 12D1 | 7200 | 10 | 1N | 7W | 1938 | 2,3,4,5 | 1 |
| Red Lion | 13C12 | 7000 | 27 | 6N | 13W | 1958 | 3,4,5 | 1 |
| Slide Rock Mt. | 13C2 | 7100 | 35 | 10N | 16W | 1937 | 4 | 1 |
| Southern Cross | 13C5 | 6500 | 8 | 5N | 13W | 1936 | 2,3,4 | 4 |
| Stemple Pass | 12C1 | 6900 | 16 | 13N | 7W | 1934 | 3,4,5 | 3 |
| Storm Lake | 13C7 | 7780 | 19 | 4N | 13W | 1939 | 2,3,4 | 1 |
| Stuart Mill | 13C6 | 6500 | 19 | 5N | 13W | 1936 | 2,3,4 | 4 |
| Stuart Mountain | 13C1 | 7400 | 6 | 14N | 18W | 1936 | 4 | 1,2 |
| TV Mountain | 14B1 | 6800 | 33 | 15N | 19W | 1956 | 1,2,3,4,5 | 1 |
| BITTERROOT RIVER | | | | | | | | |
| Ambrose | 13C16 | 6475 | 28 | 9N | 18W | 1960 | 3,4,5 | 1 |
| East Fork R.S. | 13D1 | 5400 | 16 | 2N | 17W | 1937 | 4 | 1 |
| Gibbons Pass | 13D2 | 7100 | 4 | 2S | 19W | 1934 | 1,2,3,4,5 | 3,1 |
| Idlo Pass | 14C5 | 5230 | 16 | 38N | 15E | 1956 | 3,4,5,5½ | 2 |
| Lost Horse | 14C7 | 5940 | 5 | 4N | 23W | 1960 | 3,4,5 | 1 |
| Nez Perce Camp | 14D2 | 5580 | 19&20 | 1S | 23W | 1937 | 3,4,5 | 1 |
| Nez Perce Pass | 14D1 | 6575 | 32 | 28N | 17E | 1937 | 1,2,3,4,4½,5,5½ | 1 |
| Powell R.S. | 14C6 | 4230 | 33 | 37N | 14E | 1956 | 3,4,5,5½ | 2 |
| Skalkaho Summit | 13C3 | 7259 | 30 | 6N | 17W | 1937 | 4 | 1 |
| Twin Lakes | 14C8 | 6510 | 32 | 5N | 23W | 1960 | 3,4,5 | 1 |
| ST. MARY RIVER | | | **SASKATCHEWAN RIVER BASIN** | | | | | |
| Iceberg Lake #3 | 13A3 | 5600 | 48°-50' | | 113°-43' | 1922 | 5 | |
| Josephine Upper | 13A15 | 5000 | 48°-50' | | 113°-42' | 1956 | 5 | 3,9 |
| Josephine Lower #9 | 13A14 | 4900 | 48°-47' | | 113°-41' | 1955 | 5 | |
| Mount Allen #7 | 13A7 | 5700 | 48°-46' | | 113°-41' | 1922 | 5 | 3,9 |
| Piegan #6 | 13A6 | 5500 | 48°-46½' | | 113°-41¼' | 1922 | 5 | 3,9 |
| Ptarmigan #8 | 13A8 | 5800 | 48°-50' | | 113°-44' | 1937 | 5 | 3,9 |

a. Numerals 1,2,3,4 and 5 refer to January 1, February 1, March 1, April 1 and May 1.

b. Numerals refer to Agency thet secures the snow survey as follows:

1. Soil Conservation Service
2. U. S. Forest Service
3. U. S. Geological Survey
4. Montana Power Company
5. U. S. Indian Service
6. National Park Service
7. Montana Experiment Station
8. City of Bozeman
9. Dominion Water & Power Bureau
10. U. S. Fish and Wildlife Service
11. U. S. Bureau of Reclamation
12. Montana State Forestry School

M - Soil Moisture
A - Aerial Marker

5,R-11,484 - (1960)

## COMPARISON OF SNOW COVER WITH THAT OF PREVIOUS YEARS

Summary of Snow Survey Data by Tributary Watersheds March 1, 1961

| TRIBUTARY WATERSHED | No. of Courses Averaged | No. Years Used | 1961 Snow Water Equivalent Expressed as Percent of | |
|---|---|---|---|---|
| | | | 1960 | 1943-57 Average |
| **COLUMBIA RIVER BASIN IN MONTANA** | | | | |
| Kootenai above Libby | 12 | 7-15 | 134 | 110 |
| Flathead | 16 | 7-15 | 90 | 84 |
| Lower Clark Fork | 5 | 5-15 | 128 | 91 |
| Upper Clark Fork | 13 | 5-15 | 72 | 63 |
| Bitterroot | 6 | 5-15 | 112 | 75 |
| **MISSOURI RIVER BASIN IN MONTANA** | | | | |
| Marias, Teton & Sun | 9 | 9-15 | 105 | 67 |
| Missouri Main Stem | 7 | 15 | 51 | 46 |
| Beaverhead-Jefferson | 30 | 5-15 | 82 | 62 |
| Madison-Gallatin | 10 | 10-14 | 120 | 78 |
| Judith-Musselshell | 5 | 15 | 53 | 51 |
| Upper Yellowstone | 14 | 7-15 | 116 | 77 |

## AVAILABLE SOIL MOISTURE
as of
March 1, 1961

| Drainage Basin and Station | Station No. | Elev. | Soil Profile in Inches | | Date | Soil Moisture Content in Inches About 3/1/61 | | | | Yrs |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Depth | Cap. | | 1961 | 1960 | 1959 | Avg. | |
| GALLATIN | | | | | | | | | | |
| College Site | 11D2M | 4856 | 54 | 14.5 | 3/3 | 9.9 | 10.7 | 8.8 | 8.1 | 4 |
| MADISON | | | | | | | | | | |
| Red Bluff | 11D4M | 4800 | 40 | 3.6E | 3/1 | 3.3 | - | - | - | - |
| SHIELDS | | | | | | | | | | |
| Battle Ridge | 10D11M | 6020 | 48 | 13.3 | 2/27 | 11.2 | - | - | - | - |
| Shields River | 10C4M | 5850 | 48 | 15.9 | 2/28 | 12.6 | - | - | - | - |
| FLATHEAD | | | | | | | | | | |
| Desert Mountain | 13A2M | 6370 | 54 | 6.8 | 2/28 | 6.4 | 8.1 | 8.0 | 7.5 | 4 |
| Marias Pass | 13A5M | 5250 | 54 | 8.4 | 2/26 | 5.8 | 6.4 | 6.8 | 6.2 | 7 |
| Spotted Bear R.S. | 13B15M | 3700 | 28 | 5.9 | 3/3 | 6.1 | 4.5 | 5.0 | 4.8 | 4 |
| Trout Lake | 13A12M | 3600 | 54 | 11.8 | 2/28 | 12.4 | 11.7 | 12.6 | 12.3 | 4 |

## AVAILABLE SOIL MOISTURE
as of
October 1, 1960

| | | | | | | 1960 | 1959 | 1958 | Avg. | |
|---|---|---|---|---|---|---|---|---|---|---|
| GALLATIN | | | | | | | | | | |
| College Site | 11D2M | 4856 | 54 | 14.5 | 9/30 | 5.8 | 8.6 | 6.8 | 5.8 | 4 |
| MADISON | | | | | | | | | | |
| Red Bluff | 11D4M | 4800 | 40 | 3.6E | New Station | - | - | - | - | |
| SHIELDS | | | | | | | | | | |
| Battle Ridge | 10D11M | 6020 | 48 | 13.3 | 10/3 | 10.6 | - | - | - | - |
| Shields River | 10C4M | 5850 | 48 | 15.9 | 10/3 | 11.5 | - | - | - | - |
| FLATHEAD | | | | | | | | | | |
| Desert Mountain | 13A2M | 6370 | 54 | 6.8 | 9/23 | 4.5 | 7.2 | 5.9 | 5.5 | 4 |
| Marias Pass | 13A5M | 5250 | 54 | 8.4 | 9/26 | 3.2 | 5.6 | 4.5 | 4.7 | 6 |
| Spotted Bear R.S. | 13B15M | 3700 | 28 | 5.9 | 9/23 | 0.6 | 4.3 | 3.7 | 3.1 | 4 |
| Trout Lake | 13A12M | 3600 | 54 | 11.8 | 9/23 | 6.9 | 9.8 | 10.5 | 7.9 | 4 |

# WATER SUPPLY OUTLOOK

## KOOTENAI RIVER BASIN

## MONTANA

AS OF:
MARCH 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Kootenai drainage in Montana is Excellent.

Snow survey measurements made near the first of March indicate that this year's snow-pack contains more water than on March first last year. The basin comparison shows that this year's snow-pack in the Canadian portion of the basin and in Montana is 34 percent greater than last year, and 110 percent of the 1943-57 average.

Streamflow in the Kootenai River is forecast to be slightly more than last year's flow for the April through September period.

Streamflow in the Yaak and Tobacco Rivers should be 10 to 20 percent greater than last year.

*Report Prepared by*

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SOIL CONSERVATION SERVICE
BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



USDA SCS LINCOLN NEBR 1960

5,L-16,507.1

LEGEND

- 13E2 — SNOW SURVEY COURSE
- 12D2M — SOIL MOISTURE STATION
- 13B3A — AERIAL MARKER AT SNOW COURSE
- 0125 — STREAM GAGING STATION
- DRAINAGE
- S. C. D. BOUNDARY
- WATERSHED BOUNDARY
- HIGHWAY
- TOWN
- COUNTY BOUNDARY
- STATE BOUNDARY

SCALE 10 5 0 10 MILES

USDA-SCS-LINCOLN NEBR 1960



5,L-16,507.2

# WATER SUPPLY FORECASTS

AS OF MARCH 1, 1961 - WATERSHED 1

(1000 Acre Feet)

| FORECAST POINT | | FORECAST PERIOD | FORECAST THIS YEAR | % NORMAL | MEASURED | |
|---|---|---|---|---|---|---|
| NO. | NAME | | | | LAST YEAR | NORMAL |
| 3030 | KOOTENAI RIVER<br>Libby (at) | Apr-Sept | 7568 | 98 | 7483 | 7723 |
| | | Apr-July | 6297 | 98 | 6427 | 6694 |
| 3050 | Leonia (at) | Apr-Sept | 8600 | 97 | 8440 | 8907 |
| | | Apr-July | 7582 | 97 | 7388 | 7817 |

+ Provisional data furnished by U. S. Geological Survey.

# RESERVOIR STORAGE DATA

AS OF

(1000 Acre Feet)

| NO. | RESERVOIR | USABLE CAPACITY | MEASURED | | |
|---|---|---|---|---|---|
| | | | THIS YEAR | LAST YEAR | NORMAL |
| | | | | | |

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF MARCH 1, 1961 — WATERSHED I

| SNOW COURSE NO. | SNOW COURSE NAME | ELEVATION | CURRENT INFORMATION: DATE OF SURVEY | CURRENT INFORMATION: SNOW DEPTH (Inches) | CURRENT INFORMATION: WATER CONTENT (Inches) | PAST RECORD: WATER CONTENT (Inches) LAST YEAR | PAST RECORD: WATER CONTENT (Inches) AVERAGE | YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|
| 14A4 | Brush Creek | 5000 | 2/20 | 43 | 10.6 | 10.1 | 13.2 | 9 |
| Can 10 | Fernie | 3500 | 2/28 | 28 | 7.8 | 6.7 | 9.1 | 15 |
| Can 12A | Field | 4200 | 2/27 | 24 | 8.6 | 5.2 | 5.5 | 15 |
| Can 43 | Gray Creek | 5100 | 2/27 | 64 | 19.2 | 15.6 | 16.5 | 9 |
| Can 33 | Kicking Horse | 5400 | 2/27 | 49 | 13.5 | 11.9 | 13.3 | 11 |
| Can 20E | Kimberley | 3800 | 2/27 | 42 | 10.8 | 7.3 | 7.6 | 15 |
| Can 32 | Marble Canyon | 5000 | 2/28 | 56 | 18.5 | 9.6 | 13.5 | 11 |
| Can 10A | New Fernie | 4100 | 3/2 | 54 | 10.1 | 8.8 | 13.4 | 7 |
| 15A1 | Red Mountain | 6000 | 2/23 | 64 | 19.7 | 15.1 | 18.0 | 15 |
| Can 8A | Sinclair Pass | 4500 | 2/28 | 29 | 7.3 | 6.4 | 5.6 | 10 |
| Can 20A | Sullivan Mine | 5100 | 2/27 | 54 | 14.8 | 10.2 | 13.0 | 12 |
| Can 41 | Upper Elk River | 4400 | 2/27 | 35 | 9.1 | 4.5 | 8.1 | 10 |
| 14A7 | Weasel Divide | 5450 | 2/25 | 102 | 34.0 | 27.6 | - | - |

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS LINCOLN NEBR 1960



5,L-16,395.2

# WATER SUPPLY OUTLOOK

## FLATHEAD RIVER BASIN

## MONTANA

AS OF:

MARCH 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook in the Flathead River drainage is Good.

Snow survey measurements made near the first of March indicate a great variation in the snow-pack over the Flathead Basin. Many of the higher elevation snow courses are above average, while many lower elevation courses are much below average. Over the entire basin, this year's snow-pack is 90 percent of last year and 84 percent of the 1943-57 average.

The North and Middle Forks of the Flathead are forecast to flow 5 to 10 percent more than last year during the April through September period. The South Fork is forecast at 2 percent less than last year. The Swan is expected to flow 14 percent less than last year or 97 percent average. The Flathead at Columbia Falls is forecast to flow 6,224,000 acre feet between April 1 and September 30. This figure is 99 percent average or 5 percent more than last year.

Irrigation Reservoir storage is less than last year but near the March first average.

*Report Prepared by*

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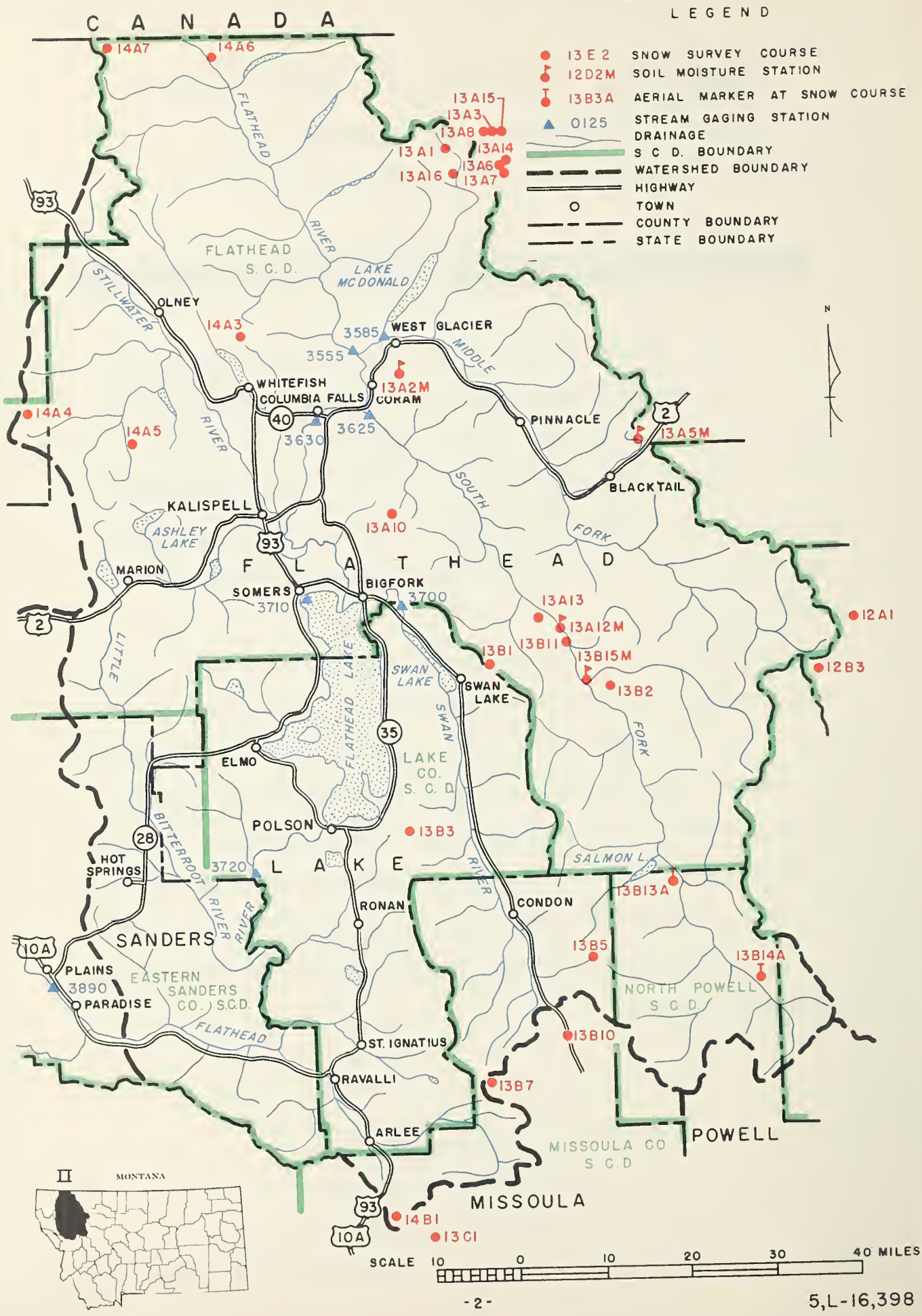
BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



USDA SCS LINCOLN NEBR 1960

5,L-16,398.1


CANADA
LEGEND
13E2 SNOW SURVEY COURSE
12D2M SOIL MOISTURE STATION
13B3A AERIAL MARKER AT SNOW COURSE
0125 STREAM GAGING STATION
DRAINAGE
S C D. BOUNDARY
WATERSHED BOUNDARY
HIGHWAY
TOWN
COUNTY BOUNDARY
STATE BOUNDARY
N
14A7
14A6
FLATHEAD
13A15
13A3
13A8
13A1
13A14
13A6
13A16
13A7
93
FLATHEAD S. C. D.
RIVER
LAKE MCDONALD
STILLWATER
OLNEY
14A3
3585
WEST GLACIER
3555
MIDDLE
13A2M
WHITEFISH
COLUMBIA FALLS
CORAM
14A4
14A5
RIVER
40
3630
3625
PINNACLE
2
13A5M
BLACKTAIL
SOUTH
FORK
KALISPELL
ASHLEY LAKE
13A10
93
F L A T H E A D
MARION
SOMERS
3710
BIGFORK
3700
13A13
13A12M
13B11
13B1
13B15M
12A1
12B3
2
LITTLE
FLATHEAD LAKE
SWAN LAKE
SWAN LAKE
13B2
SWAN
FORK
35
LAKE CO. S. C. D.
ELMO
POLSON
13B3
28
BITTERROOT
HOT SPRINGS
3720
L A K E
SALMON L.
RIVER
13B13A
RONAN
CONDON
10A
SANDERS
13B5
13B14A
PLAINS
3890
EASTERN SANDERS CO. S.C.D.
PARADISE
NORTH POWELL S C D.
FLATHEAD
13B10
ST. IGNATIUS
RAVALLI
13B7
ARLEE
MISSOULA CO S C D
POWELL
93
MISSOULA
14B1
10A
13C1
MONTANA
SCALE 10 0 10 20 30 40 MILES
USDA SCS-LINCOLN NEBR 1960



5,L-16,398

# WATER SUPPLY FORECASTS

## AS OF MARCH 1, 1961 - WATERSHED II

(1000 Acre Feet)

| FORECAST POINT NO. | FORECAST POINT NAME | FORECAST PERIOD | FORECAST THIS YEAR | % NORMAL | MEASURED LAST YEAR | MEASURED NORMAL |
|---|---|---|---|---|---|---|
| | NORTH FORK FLATHEAD RIVER | | | | | |
| 3555 | Columbia Falls (near) | Apr-Sept | 2118 | 109 | 1905 | 1942 |
| | | Apr-July | 1923 | 109 | 1735 | 1769 |
| | | Apr-June | 1625 | 109 | 1470 | 1491 |
| | MIDDLE FORK FLATHEAD RIVER | | | | | |
| 3585 | West Glacier (near) | Apr-Sept | 1830 | 97 | 1742 | 1881 |
| | | Apr-July | 1694 | 97 | 1614 | 1747 |
| | | Apr-June | 1426 | 96 | 1359 | 1487 |
| | SOUTH FORK FLATHEAD RIVER | | | | | |
| 3625 | Columbia Falls (nr)(17) | Apr-Sept | 2112 | 92 | 2147 | 2297 |
| | | Apr-July | 1997 | 92 | 2039 | 2180 |
| | | Apr-June | 1766 | 93 | 1792 | 1901 |
| | FLATHEAD RIVER | | | | | |
| 3630 | Columbia River (at)(17) | Apr-Sept | 6224 | 99 | 5888 | 6299 |
| | | Apr-July | 5678 | 97 | 5465 | 5845 |
| | | Apr-June | 4893 | 98 | 4695 | 4993 |
| 3720 | Polson (near)(18) | Apr-Sept | 7355 | 98 | 7377 | 7463 |
| | | Apr-July | 6746 | 97 | 6832 | 6939 |
| | | Apr-June | 5661 | 96 | 5837 | 5897 |
| | SWAN RIVER | | | | | |
| 3700 | Big Fork (near) | Apr-Sept | 620 | 97 | 724 | 641 |
| | | Apr-July | 555 | 97 | 634 | 568 |
| | | Apr-June | 446 | 97 | 513 | 460 |

(17) Observed flow plus change in storage in Hungry Horse Reservoir.
(18) Observed flow plus change in storage in Hungry Horse Res. & Flathead Lake.
( +) Provisional data furnished by U. S. Geological Survey.

# RESERVOIR STORAGE DATA

## AS OF FEBRUARY 28, 1961

(1000 Acre Feet)

| NO. | RESERVOIR | USABLE CAPACITY | MEASURED THIS YEAR | MEASURED LAST YEAR | MEASURED NORMAL |
|---|---|---|---|---|---|
| 3620 | Hungry Horse | 3428.0 | 3175.0 | 2962.0 | 2199.3 |
| 3710 | Flathead | 1791.0 | 1078.0 | 1209.0 | 768.2 |
| 3757 | Camas | 45.2 | 25.5 | 35.0 | 25.1 |
| 3800 | Mission Valley | 100.3 | 30.0 | 49.6 | 35.5 |

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

USDA SCS-LINCOLN NEBR 1960



5,L-16,395.1

# SNOW SURVEY DATA

AS OF MARCH 1, 1961

WATERSHED II

| SNOW COURSE | | | CURRENT INFORMATION | | | PAST RECORD | | |
|---|---|---|---|---|---|---|---|---|
| | | | DATE OF SURVEY | SNOW DEPTH (Inches) | WATER CONTENT (Inches) | WATER CONTENT (Inches) | | YEARS OF RECORD |
| NO. | NAME | ELEVATION | | | | LAST YEAR | AVERAGE | |
| 13B14A | Basin Creek | 5000 | 3/4 | 26 | 6.6 | 4.2 | 8.8 | 7 |
| 14B3 | Bassoo Peak | 5150 | 2/28 | 30 | 8.2 | - | - | - |
| 13B3 | Big Creek | 6750 | 3/2 | 97 | 36.1 | 40.2 | 36.6 | 15 |
| 14A4 | Brush Creek | 5000 | 2/20 | 43 | 10.6 | 10.1 | 13.2 | 9 |
| 13A1 | Cattle Queen | 4700 | 2/26 | 96 | 24.4 | 21.8 | 29.9 | 13 |
| 13A2M | Desert Mountain | 5600 | 2/28 | 44 | 12.2 | 13.9 | 14.2 | 9 |
| Can 10 | Fernie | 3500 | 2/28 | 28 | 7.8 | 6.7 | 9.1 | 15 |
| 14A9 | Griffin Creek Divide | 5150 | 2/27 | 35 | 9.1 | 11.8 | - | - |
| 14A3 | Hell Roaring Divide | 5770 | 2/27 | 87 | 28.6 | 29.3 | 26.8 | 7 |
| 13B13A | Holbrook | 4530 | 3/4 | 26 | 8.4 | 8.6 | 9.5 | 7 |
| 14A6 | Kishenehn | 3886 | 2/27 | 34 | 8.0 | 9.9 | 10.4 | 13 |
| 14A5 | Logan Creek | 4300 | 2/20 | 23 | 6.2 | 7.2 | 8.9 | 9 |
| 13A5M | Marias Pass | 5250 | 2/28 | 48 | 14.1 | 12.3 | 17.4 | 15 |
| 13A16 | Mineral Creek | 4000 | 2/26 | 61 | 16.9 | 15.4 | - | - |
| Can 10A | New Fernie | 4100 | 3/2 | 54 | 10.1 | 8.8 | 13.4 | 7 |
| 13B7 | North Fork Jocko | 6330 | 3/7 | 118 | 40.3 | 33.3 | 38.3 | 15 |
| 13B2 | Spotted Bear Mt. | 7000 | 3/2 | 41 | 11.2 | 12.5 | 15.2 | 10 |
| 13A10 | Strawberry Lake | 6500 | 2/28 | 93 | 26.8 | 43.1 | 35.7 | 7 |
| 13B1 | Trinkus Lake | 6500 | 2/27 | 107 | 34.0 | 35.1 | 35.4 | 8 |
| 13A12M | Trout Lake | 3600 | 3/2 | 32 | 8.2 | 13.5 | 16.4 | 10 |
| 14B1 | TV Mountain | 6800 | 2/24 | 42 | 10.5 | 11.4 | - | - |
| 13B11 | Twin Creeks | 3580 | 3/2 | 30 | 8.7 | 11.1 | 11.0 | 7 |
| 13B5 | Upper Holland Lake | 7000 | 2/28 | 80 | 24.6 | 25.9 | 31.0 | 8 |
| 14A7 | Weasel Divide | 5450 | 2/25 | 102 | 34.0 | 27.6 | - | - |

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS LINCOLN NEBR '960



5,L-16,395.2

# WATER SUPPLY OUTLOOK

## LOWER CLARK FORK RIVER BASIN

## MONTANA

AS OF:

MARCH 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Clark Fork River below Missoula and tributary streams is Good.

Snow survey measurements made near the first of March indicate the snow-pack contains 28 percent more water than on March first last year, or 91 percent of the 1943-57 average.

April through September streamflow forecasts for the Clark Fork vary from 80 percent of last year at Missoula to 95 percent of last year at Plains. Tributary streams should flow between 5 to 15 percent more than last year.

*Report Prepared by*

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



USDA SCS LINCOLN NEBR 1960

5,L-16,506.1

USDA SCS LINCOLN NEBR 980

5,L-16,506.2

# WATER SUPPLY FORECASTS

## AS OF MARCH 1, 1961 - WATERSHED III

(1000 Acre Feet)

| FORECAST POINT NO. | FORECAST POINT NAME | FORECAST PERIOD | FORECAST THIS YEAR | % NORMAL | MEASURED LAST YEAR | MEASURED NORMAL |
|---|---|---|---|---|---|---|
| | BLACKFOOT RIVER | | | | | |
| 3400 | Bonner (near) | Apr-Sept | 754 | 76 | 818 | 999 |
| | | Apr-July | 671 | 74 | 736 | 907 |
| | | Apr-June | 574 | 74 | 655 | 775 |
| | CLARK FORK RIVER | | | | | |
| 3404 | Milltown (above)(14) | Apr-Sept | 428 | 52 | 672 | 815 |
| | | Apr-July | 366 | 50 | 576 | 716 |
| | | Apr-June | 304 | 50 | 525 | 609 |
| 3405 | Missoula (above) | Apr-Sept | 1182 | 65 | 1490 | 1814 |
| | | Apr-July | 1037 | 64 | 1312 | 1620 |
| | | Apr-June | 886 | 64 | 1180 | 1384 |
| 3530 | Missoula (below) | Apr-Sept | 2400 | 71 | 2712 | 3361 |
| | | Apr-July | 2172 | 71 | 2450 | 3059 |
| | | Apr-June | 1818 | 70 | 2202 | 2608 |
| 3545 | St. Regis (at) | Apr-Sept | 3315 | 73 | 3645 | 4549 |
| | | Apr-July | 2981 | 72 | 3286 | 4140 |
| | | Apr-June | 2522 | 71 | 2951 | 3551 |
| 3890 | Plains (near)(18) | Apr-Sept | 10809 | 88 | 11238 | 12337 |
| | | Apr-July | 9958 | 88 | 10226 | 11316 |
| | | Apr-June | 8470 | 88 | 8885 | 9625 |
| 3910 | Thompson Falls (at)(18) | Apr-Sept | No Forecasts (A) | | | |
| 3920 | Whitehorse Rapdis (at)(19) | Apr-Sept | 12205 | 88 | 12992 | 13932 |
| | | Apr-July | 11231 | 88 | 11815 | 12763 |
| | | Apr-June | 9518 | 88 | 10193 | 10816 |

(A) Thompson Falls stream measurements discontinued by U. S. Geological Survey 9/30/59.
(14) Difference in observed flow, Clark Fork above Missoula & Blackfoot at Bonner.
(18) Observed flow plus change in storage in Flathead Lake & Hungry Horse Res.
(19) Observed flow plus change in storage in Hungry Horse Reservoir, Flathead Lake and Noxon Reservoir.
(+) Provisional data furnished by U. S. Geological Survey.

# RESERVOIR STORAGE DATA

## AS OF

(1000 Acre Feet)

| NO. | RESERVOIR | USABLE CAPACITY | MEASURED THIS YEAR | MEASURED LAST YEAR | MEASURED NORMAL |
|---|---|---|---|---|---|
| | | | | | |

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF MARCH 1, 1961

WATERSHED III

| SNOW COURSE NO. | SNOW COURSE NAME | ELEVATION | CURRENT INFORMATION: DATE OF SURVEY | CURRENT INFORMATION: SNOW DEPTH (Inches) | CURRENT INFORMATION: WATER CONTENT (Inches) | PAST RECORD: WATER CONTENT (Inches) LAST YEAR | PAST RECORD: WATER CONTENT (Inches) AVERAGE | PAST RECORD: YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|
| 13B10 | Coyote Hill | 4200 | 2/28 | 29 | 8.4 | 9.0 | 10.1 | 11 |
| 15C2 | Fish Lake Airstrip | 5000 | 3/4 | 104 | 36.0 | 28.7 | 37.1 | 5 |
| 14C5 | Lolo Pass | 5230 | 2/27 | 84 | 28.4 | 18.9 | 30.5 | 8 |
| 15B2 | Lookout | 5250 | 2/28 | 91 | 29.8 | 24.0 | 34.2 | 15 |
| 13C8 | Lubrecht Forest #6 | 4040 | 3/1 | 8 | 2.8 | 1.7 | 4.3 | 7 |
| 13B7 | North Fork Jocko | 6330 | 3/7 | 118 | 40.3 | 33.3 | 38.3 | 15 |
| 14C6 | Powell R. S. | 4230 | 2/28 | 34 | 9.6 | 9.6 | - | - |
| 14C4 | Savage Pass | 6600 | 2/27 | 67 | 21.0 | 18.0 | - | - |
| 14B1 | TV Mountain | 6800 | 2/24 | 42 | 10.5 | 11.4 | - | - |

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS LINCOLN NEBR 1960



5,L-16,395.2

# WATER SUPPLY OUTLOOK

## UPPER CLARK FORK RIVER BASIN

## MONTANA

AS OF:
MARCH 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook in the Upper Clark Fork basin is Fair to Poor.

Farmers who depend upon natural streamflow for irrigation should give serious consideration to planting early maturing crops, such as grains and millet for hay. Starting new stands of hay and pasture should be deferred, as the water supply may be most critical later in the irrigation season. Those dependent upon a limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems.

Good water management and proper application will be necessary to obtain the most beneficial use of the limited water supply.

Snow surveys made near the first of March indicate a deficient snowpack in the headwaters of the Clark Fork and Blackfoot basins. All snow course measurements are below the 1943-57 average.

Over the headwaters of these two basins, the water stored in this year's snow pack is 72 percent of last year and 63 percent average.

April through September streamflow is forecast 40 percent below average on Flint Creek and Boulder Creek. The Clark Fork above Milltown is forecast at 64 percent of last year. The Blackfoot River is expected to flow about 10 percent less than last year.

*Report Prepared by*

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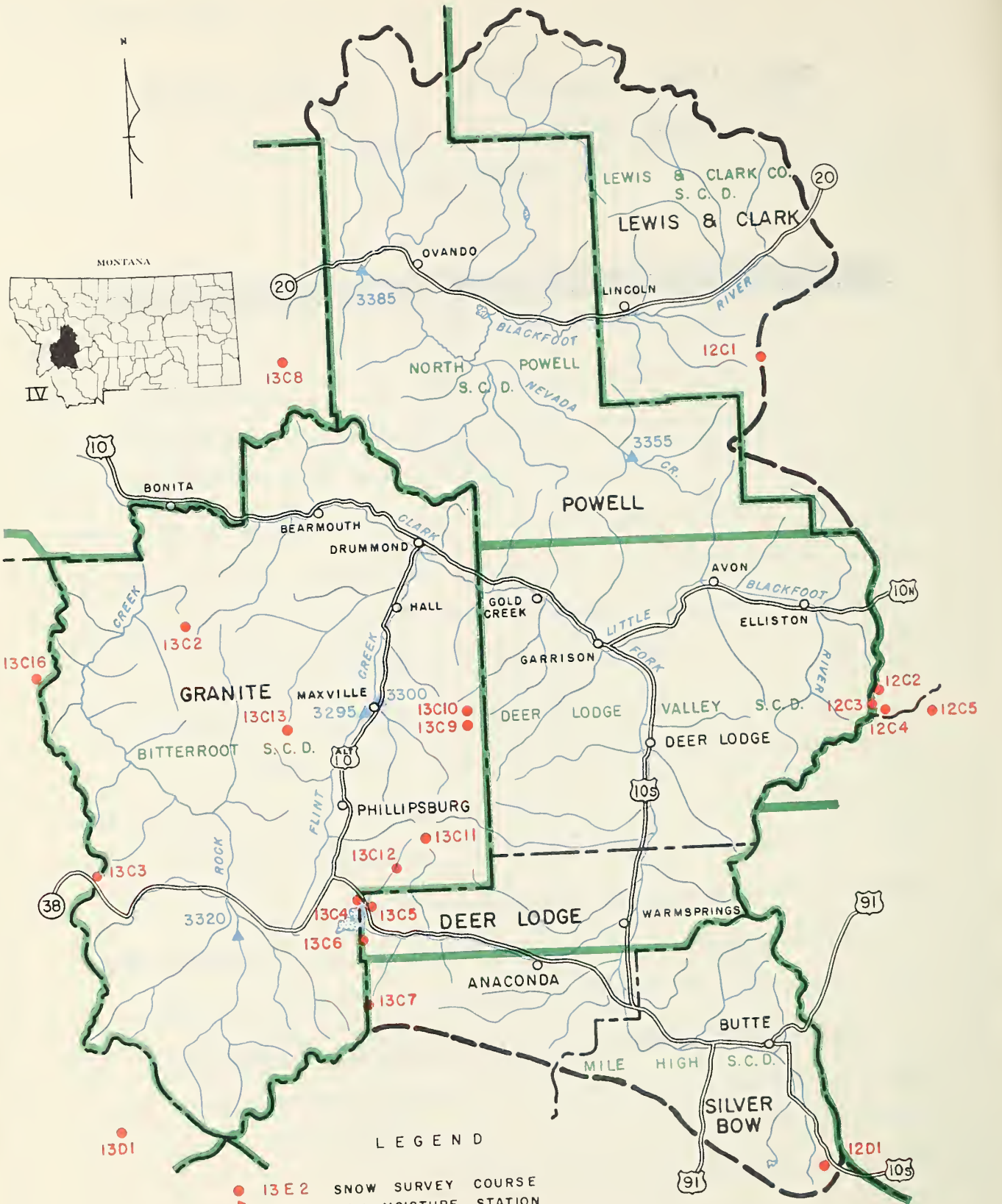
**THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY**



USDA SCS LINCOLN NEBR 1960

5,L-16,396.1






5,L-16,396

USDA SCS LINCOLN NEBR 1960

# WATER SUPPLY FORECASTS

## AS OF MARCH 1, 1961 - WATERSHED IV

(1000 Acre Feet)

| FORECAST POINT NO. | FORECAST POINT NAME | FORECAST PERIOD | FORECAST THIS YEAR | % NORMAL | MEASURED LAST YEAR | MEASURED NORMAL |
|---|---|---|---|---|---|---|
| | FLINT CREEK | | | | | |
| 3295 | Maxville (at) | Apr-Sept | 27.2 | 59 | | 46.4 |
| | | Apr-July | 21.2 | 60 | | 35.4 |
| | BOULDER CREEK | | | | | |
| 3300 | Maxville (at) | Apr-Sept | 17.2 | 61 | | 28.2 |
| | | Apr-July | 15.6 | 60 | | 25.8 |
| | MIDDLE FORK ROCK CREEK | | | | | |
| 3320 | Philipsburg (near) | Apr-Sept | 54.1 | 68 | | 82.2 |
| | | Apr-July | 50.0 | 69 | | 72.1 |
| | BLACKFOOT RIVER | | | | | |
| 3400 | Bonner (near) | Apr-Sept | 754 | 76 | 818 | 999 |
| | | Apr-July | 671 | 74 | 736 | 907 |
| | | Apr-June | 574 | 74 | 655 | 775 |
| | CLARK FORK RIVER | | | | | |
| 3404 | Milltown (above) (14) | Apr-Sept | 428 | 52 | 672 | 815 |
| | | Apr-July | 366 | 50 | 576 | 716 |
| | | Apr-June | 304 | 50 | 525 | 609 |

(14) Difference in observed flow, Clark Fork above Missoula & Blackfoot at Bonner.
( +) Provisional data furnished by U. S. Geological Survey.

# RESERVOIR STORAGE DATA

## AS OF FEBRUARY 28, 1961

(1000 Acre Feet)

| NO. | RESERVOIR | USABLE CAPACITY | MEASURED THIS YEAR | MEASURED LAST YEAR | MEASURED NORMAL |
|---|---|---|---|---|---|
| 3250 | Georgetown Lake | 31.0 | 23.3 | 28.2 | 23.0 |
| 3365 | Nevada Creek | 12.6 | | 7.3 | 7.0 |

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

USDA-SCS-LINCOLN NEBR 1960



5,L-16,395.1

# SNOW SURVEY DATA

AS OF MARCH 1, 1961 — WATERSHED IV

| SNOW COURSE | | | CURRENT INFORMATION | | | PAST RECORD | | |
|---|---|---|---|---|---|---|---|---|
| | | | DATE OF SURVEY | SNOW DEPTH (Inches) | WATER CONTENT (Inches) | WATER CONTENT (Inches) | | YEARS OF RECORD |
| NO. | NAME | ELEVATION | | | | LAST YEAR | AVERAGE | |
| 13C16 | Ambrose | 6475 | 2/28 | 38 | 9.2 | 8.6 | - | - |
| 13C13 | Black Pine | 7100 | 2/28 | 33 | 7.8 | 8.2 | - | - |
| 12C5 | Chessman Reservoir | 6200 | 2/27 | 1 | 0.2 | 4.1 | 4.3 | 15 |
| 13C9 | El Dorado Mine | 7800 | 2/27 | 42 | 11.8 | 16.1 | 16.3 | 5 |
| 13C11 | Fred Burr Pass | 8000 | 3/2 | 60 | 17.1 | 17.4 | - | - |
| 13C10 | Gold Creek Lake | 7200 | 2/27 | 34 | 9.0 | 9.6 | 13.3 | 5 |
| 13C4 | Intergaard | 6450 | 3/1 | 21 | 5.0 | 5.8 | 6.6 | 15 |
| 13C8 | Lubrecht Forest #6 | 4040 | 3/1 | 8 | 2.8 | 1.7 | 4.3 | 7 |
| 12D1 | Pipestone Pass | 7200 | 2/20 | 11 | 3.0 | 5.5 | 4.4 | 15 |
| 13C12 | Red Lion | 7000 | 3/2 | 45 | 10.6 | 9.6 | - | - |
| 13C3 | Skalkaho Summit | 7259 | 2/28 | 66 | 19.6 | 14.7 | - | - |
| 13C2 | Slide Rock Mountain | 7100 | 3/1 | 34 | 8.8 | 9.8 | - | - |
| 13C5 | Southern Cross | 6500 | 3/1 | 13 | 3.8 | 4.5 | 5.0 | 15 |
| 12C1 | Stemple Pass | 6900 | 2/27 | 22 | 4.7 | 7.2 | 9.2 | 15 |
| 13C7 | Storm Lake | 7780 | 3/3 | 38 | 9.4 | 9.2 | 11.2 | 5 |
| 13C6 | Stuart Mill | 6500 | 3/1 | 12 | 3.5 | 4.6 | 5.6 | 15 |
| 12C2 | Tenmile, Lower | 6250 | 2/26 | 14 | 3.2 | 6.0 | 6.3 | 15 |
| 13C3 | Tenmile, Middle | 6800 | 2/25 | 22 | 4.9 | 8.5 | 9.2 | 15 |
| 12C4 | Tenmile, Upper | 8000 | 2/25 | 28 | 6.5 | 11.0 | 11.9 | 15 |

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS-LINCOLN NEBR 1960



5,L-16,395.2

# WATER SUPPLY OUTLOOK

## BITTERROOT RIVER BASIN

## MONTANA

AS OF:

MARCH 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook in the Bitterroot River drainage is Fair.

Farmers who depend upon natural streamflow for irrigation should give serious consideration to planting early maturing crops, such as grains and millet for hay. Starting new stands of hay and pasture should be deferred, as the water supply may be most critical later in the irrigation season. Those dependent upon a limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems.

Good water management and proper application will be necessary to obtain the most beneficial use of the limited water supply.

Snow surveys made near the first of March indicate that water stored in the snow-pack is 12 percent greater than last year, but only 75 percent average.

Streamflow in the Bitterroot drainage is forecast to be 20 to 30 percent below the 1943-57 average during the April-September period, with the exception of Blodgett Creek. The Bitterroot River at Darby is expected to flow 462,000 acre feet of water during April through September. This figure is 89 percent of last year's flow and 79 percent average.

*Report Prepared by*

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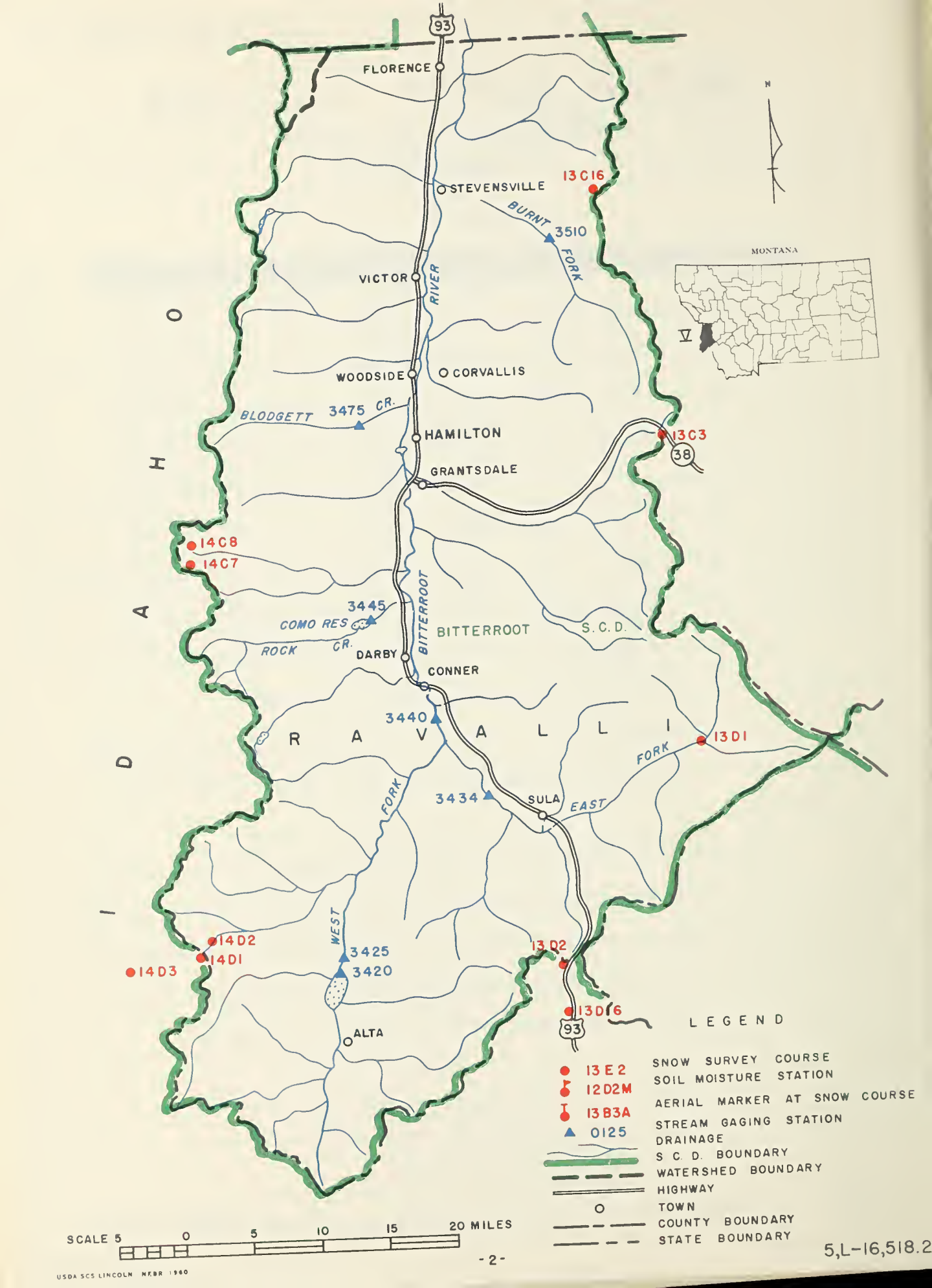
BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



USDA SCS LINCOLN NEBR 1960

5,L-16,518.1


93
FLORENCE
STEVENSVILLE
13C16
BURNT FORK
3510
VICTOR
RIVER
MONTANA
WOODSIDE
CORVALLIS
BLODGETT
3475
CR.
HAMILTON
13C3
38
GRANTSDALE
14C8
14C7
3445
COMO RES
ROCK CR.
BITTERROOT
BITTERROOT S.C.D.
DARBY
CONNER
3440
RAVALLI
13D1
FORK
3434
SULA
EAST FORK
WEST FORK
14D2
14D1
14D3
3425
3420
13D2
13D16
93
ALTA
N
LEGEND
13E2 SNOW SURVEY COURSE
12D2M SOIL MOISTURE STATION
13B3A AERIAL MARKER AT SNOW COURSE
0125 STREAM GAGING STATION
DRAINAGE
S.C.D. BOUNDARY
WATERSHED BOUNDARY
HIGHWAY
TOWN
COUNTY BOUNDARY
STATE BOUNDARY
SCALE 5 0 5 10 15 20 MILES
USDA SCS LINCOLN NEBR 1960



5,L-16,518.2

# WATER SUPPLY FORECASTS

## AS OF MARCH 1, 1961 - WATERSHED V

(1000 Acre Feet)

| FORECAST POINT | | FORECAST | FORECAST | % | MEASURED | |
|---|---|---|---|---|---|---|
| NO. | NAME | PERIOD | THIS YEAR | NORMAL | LAST YEAR | NORMAL |
| | WEST FORK BITTERROOT RIVER | | | | | |
| 3425 | Conner (near) (15) | Apr-Sept | 123 | 70 | | 176 |
| | | Apr-July | 112 | 68 | | 164 |
| | BITTERROOT RIVER | | | | | |
| 3440 | Darby (near) | Apr-Sept | 462 | 79 | 521 | 587 |
| | | Apr-July | 424 | 76 | 480 | 547 |
| | | Apr-June | 363 | 76 | 434 | 477 |
| 3528 | Missoula (near) (16) | Apr-Sept | 1218 | 78 | 1222 | 1557 |
| | | Apr-July | 1132 | 78 | 1138 | 1450 |
| | | Apr-June | 968 | 78 | 1027 | 1244 |
| | BLODGETT CREEK | | | | | |
| 3475 | Corvallis (near) | Apr-Sept | 43.8 | 93 | | 46.7 |
| | | Apr-July | 39.5 | 90 | | 44.4 |
| | BURNT FORK CREEK | | | | | |
| 3510 | Stevensville (near) | Apr-Sept | 23.0 | 74 | | 31.2 |
| | | Apr-July | 19.9 | 71 | | 28.0 |

(15) Observed flow plus change in storage in West Fork Bitterroot River Reservoir.
(16) Difference in observed flow, Clark Fork above and below Missoula.
( +) Provisional data furnished by U. S. Geological Survey.

# RESERVOIR STORAGE DATA

## AS OF

(1000 Acre Feet)

| NO. | RESERVOIR | USABLE CAPACITY | MEASURED | | |
|---|---|---|---|---|---|
| | | | THIS YEAR | LAST YEAR | NORMAL |
| | | | | | |

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF MARCH 1, 1961

WATERSHED V

| SNOW COURSE | | | CURRENT INFORMATION | | | PAST RECORD | | |
|---|---|---|---|---|---|---|---|---|
| | | | DATE OF SURVEY | SNOW DEPTH (Inches) | WATER CONTENT (Inches) | WATER CONTENT (Inches) | | YEARS OF RECORD |
| NO. | NAME | ELEVATION | | | | LAST YEAR | AVERAGE | |
| 13C16 | Ambrose | 6475 | 2/28 | 38 | 9.2 | 8.6 | - | - |
| 13D1 | East Fork R. S. | 5400 | 2/24 | 14 | 4.6 | 5.3 | 5.6 | 5 |
| 13D2 | Gibbons Pass | 7100 | 2/27 | 55 | 15.4 | 14.9 | 22.2 | 15 |
| 14C5 | Lolo Pass | 5230 | 2/27 | 84 | 28.4 | 18.9 | 30.5 | 8 |
| 14C7 | Lost Horse | 5940 | 2/27 | 79 | 25.0 | 19.3 | - | - |
| 13D16 | Moose Creek | 6200 | 2/27 | 40 | 10.6 | 10.8 | 16.1 | 15 |
| 14D2 | Nez Perce Camp | 5580 | 2/23 | 32 | 9.2 | 9.1 | 12.6 | 12 |
| 14D1 | Nez Perce Pass | 6575 | 2/23 | 32 | 9.3 | 10.2 | 16.7 | 13 |
| 14C6 | Powell R. S. | 4230 | 2/28 | 34 | 9.6 | 9.6 | - | - |
| 14C4 | Savage Pass | 6600 | 2/27 | 67 | 21.0 | 18.0 | - | - |
| 13C3 | Skalkaho Summit | 7259 | 2/28 | 66 | 19.6 | 14.7 | - | - |
| 14C8 | Twin Lakes | 6510 | 2/27 | 99 | 31.8 | 24.7 | - | - |

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS LINCOLN NEBR 1960



5,L-16,395.2

# WATER SUPPLY OUTLOOK

## MARIAS, TETON, & SUN RIVER BASINS

## MONTANA

AS OF:
MARCH 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook in this area is Good to Fair.

Farmers who depend upon natural streamflow for irrigation should give serious consideration to planting early maturing crops, such as grains and millet for hay. Starting new stands of hay and pasture should be deferred, as the water supply will be most critical later in the irrigation season. Those dependent upon a limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems.

Good water management and proper application will be necessary to obtain the most beneficial use of the limited water supply.

Snow survey measurements made near the first of March indicate that water stored in the snow-pack is 5 percent greater than last year, but is 67 percent of the 1943-57 average.

The April through September inflow into Gibson Reservoir is forecast at 484,000 acre feet, which is 10 percent more than last year or 82 percent average. The Marias River is expected to flow 15 percent more than last year.

Measurements at Cabin Creek and Wrong Creek snow courses could not be obtained this month, but will be measured near the first of April.

Storage in irrigation reservoirs is below average.

*Report Prepared by*

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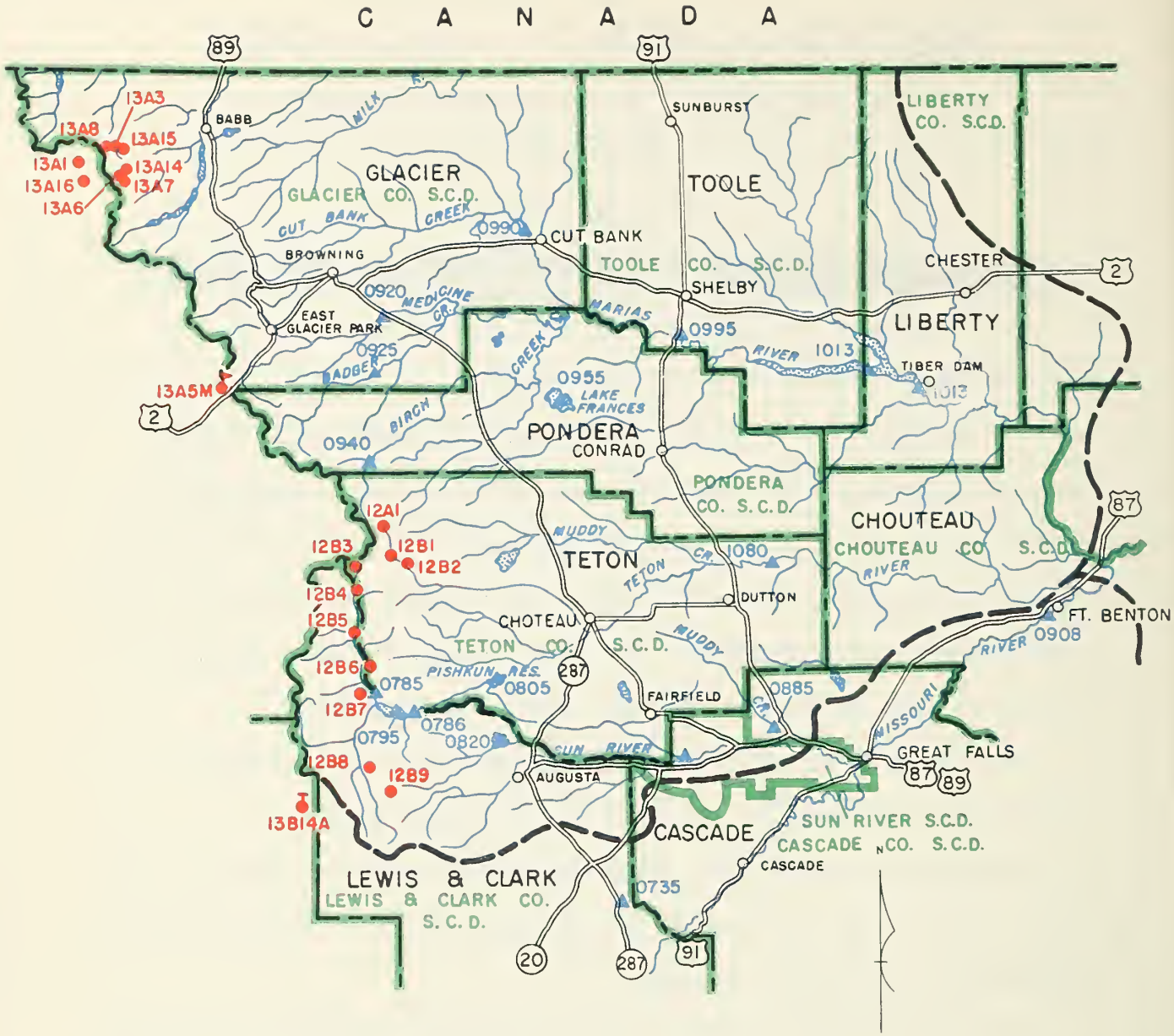
THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



USDA SCS LINCOLN NEBR. 1960

5,L-16,502.1




LEGEND

- 13 E 2 — SNOW SURVEY COURSE
- 12D2M — SOIL MOISTURE STATION
- 13B3A — AERIAL MARKER AT SNOW COURSE
- 0125 — STREAM GAGING STATION
- DRAINAGE
- S C D BOUNDARY
- WATERSHED BOUNDARY
- HIGHWAY
- TOWN
- COUNTY BOUNDARY
- STATE BOUNDARY

SCALE 10 0 10 20 30 40 MILES



5,L-16,502.2

# WATER SUPPLY FORECASTS

## AS OF MARCH 1, 1961 - WATERSHED VI

(1000 Acre Feet)

| FORECAST POINT | | FORECAST | FORECAST | % | MEASURED | |
|---|---|---|---|---|---|---|
| NO. | NAME | PERIOD | THIS YEAR | NORMAL | LAST YEAR+ | NORMAL |
| | N. FORK OF N. FORK SUN | | | | | |
| 0785 | Augusta (near) | Apr-Sept | 196 | 82 | | 239 |
| | | Apr-July | 182 | 82 | | 222 |
| | SUN RIVER | | | | | |
| 0786 | Gibson Dam (at) | Apr-Sept | 484 | 82 | 436 | 588 |
| | | Apr-July | 441 | 82 | 395 | 538 |
| | MARIAS RIVER | | | | | |
| 0995 | Shelby (near) | Apr-Sept | 502 | 76 | 436 | 659 |
| | | Apr-July | 461 | 76 | 408 | 605 |

(10) Difference in observed flow, North Fork of North Fork Sun near Augusta, and Sun at Gibson Dam.
(+ ) Provisional data furnished by U. S. Geological Survey.

# RESERVOIR STORAGE DATA

## AS OF FEBRUARY 28, 1961

(1000 Acre Feet)

| NO. | RESERVOIR | USABLE CAPACITY | MEASURED | | |
|---|---|---|---|---|---|
| | | | THIS YEAR | LAST YEAR | NORMAL |
| 1013 | Tiber | 1316.0 | 631.8 | 636.1 | |
| 0955 | Lake Francis | 112.0 | 77.7 | 96.3 | 94.6 |
| 0805 | Pishkun | 32.0 | 16.8 | 21.6 | 18.8 |
| 0795 | Gibson | 105.0 | 37.4 | 70.8 | 63.3 |
| 0820 | Willow Creek | 32.3 | 15.1 | 14.4 | 19.2 |
| 0940 | Swift | 30.0 | 14.3 | 27.0 | 23.1 |

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

USDA SCS-LINCOLN NEBR 1960



5,L-16,395.1

# SNOW SURVEY DATA

AS OF MARCH 1, 1961 — WATERSHED VI

| SNOW COURSE | | | CURRENT INFORMATION | | | PAST RECORD | | |
|---|---|---|---|---|---|---|---|---|
| | | | DATE OF SURVEY | SNOW DEPTH (Inches) | WATER CONTENT (Inches) | WATER CONTENT (Inches) | | YEARS OF RECORD |
| NO. | NAME | ELEVATION | | | | LAST YEAR | AVERAGE | |
| 12B8 | Benchmark | 5500 | 2/21 | 14 | 5.1 | 5.2 | 9.0 | 9 |
| 12B6 | Cabin Creek | 5400 | Not measured | | | 5.6 | 6.8 | 9 |
| 12B9 | Five-Bull | 5600 | 2/21 | 8 | 2.3 | 4.2 | 7.0 | 9 |
| 12A1 | Freight Creek | 6000 | 2/23 | 37 | 10.8 | 10.0 | 15.6 | 10 |
| 12B5 | Gates Park | 5300 | 3/4 | 28 | 7.0 | 6.2 | 10.1 | 9 |
| 12B7 | Goat Mountain | 7000 | 2/28 | 31 | 7.5 | 7.9 | 10.7 | 15 |
| 13A5M | Marias Pass | 5250 | 2/28 | 48 | 14.1 | 12.3 | 17.4 | 15 |
| 12B2 | Waldron Creek | 5600 | 2/23 | 10 | 2.8 | 3.7 | 6.9 | 10 |
| 12B1 | West Fork | 6000 | 2/23 | 25 | 8.5 | 9.0 | 14.9 | 10 |
| 12B4 | Wrong Creek | 5700 | Not measured | | | 9.5 | 15.1 | 9 |
| 12B3 | Wrong Ridge | 6800 | 3/4 | 61 | 18.0 | 14.0 | 21.2 | 9 |

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS LINCOLN NEBR 1960



5,L-16,395.2

# WATER SUPPLY OUTLOOK

## MISSOURI RIVER (MAIN STEM) BASIN

## MONTANA

AS OF:
MARCH 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the tributary streams to the Missouri Main Stem is Poor.

Farmers who depend upon natural streamflow for irrigation should give serious consideration to planting early maturing crops, such as grains and millet for hay. Starting new stands of hay and pasture should be deferred, as the water supply will be most critical later in the irrigation season. Those dependent upon a limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems.

Good water management and proper application will be necessary to obtain the most beneficial use of the limited water supply.

Snow surveys made near the first of March indicate that water stored in the snow-pack is 51 percent of last year and 46 percent of the 1943-57 average.

Streamflow in the Missouri River is expected to be nearly the same as last year. Tributary streams, such as Prickly Pear Creek, Tenmile Creek, Sheep Creek and Smith River, are forecast to flow 40 to 60 percent of average. Prickly Pear Creek is expected to flow about 40 percent less than last year, or 50 percent average.

*Report Prepared by*

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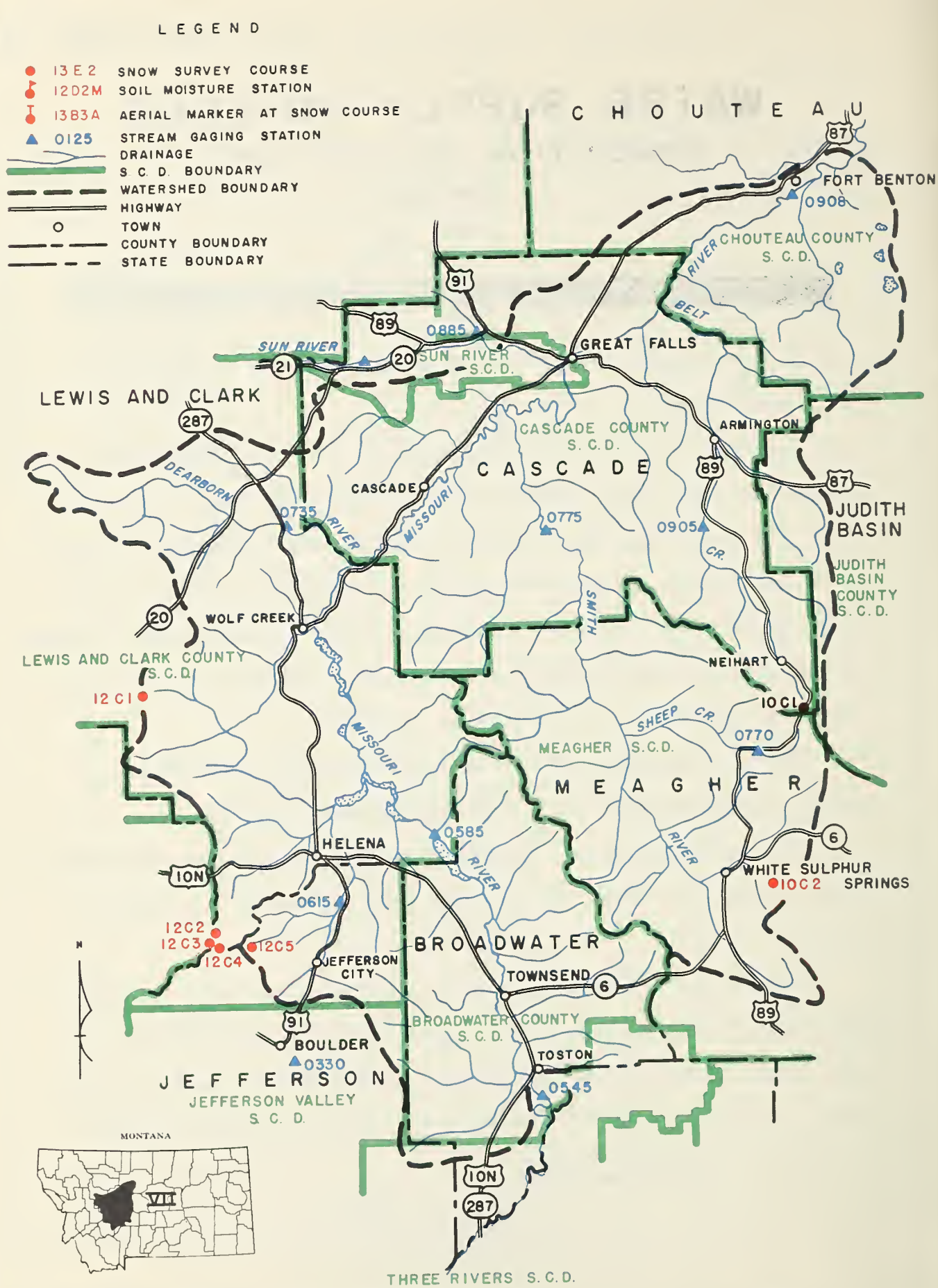
BOX 855 BOZEMAN, MONTANA

**THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY**



USDA SCS LINCOLN NEBR 1960

5,L-16,400.1


LEGEND
13 E 2 SNOW SURVEY COURSE
12D2M SOIL MOISTURE STATION
1383A AERIAL MARKER AT SNOW COURSE
0125 STREAM GAGING STATION
DRAINAGE
S. C. D. BOUNDARY
WATERSHED BOUNDARY
HIGHWAY
TOWN
COUNTY BOUNDARY
STATE BOUNDARY
CHOUTEAU
FORT BENTON
0908
CHOUTEAU COUNTY S. C. D.
RIVER
BELT
91
89
0885
SUN RIVER
SUN RIVER S.C.D.
GREAT FALLS
21
20
LEWIS AND CLARK
287
CASCADE COUNTY S. C. D.
ARMINGTON
CASCADE
DEARBORN
0735
RIVER
MISSOURI
0775
0905
CR.
87
JUDITH BASIN
JUDITH BASIN COUNTY S. C. D.
WOLF CREEK
SMITH
LEWIS AND CLARK COUNTY S. C. D.
NEIHART
12 C1
10 C1
SHEEP CR.
0770
MEAGHER S.C.D.
MEAGHER
MISSOURI
0585
HELENA
RIVER
6
WHITE SULPHUR SPRINGS
10 C 2
10N
0615
12C2
12C3
12C4
12C5
BROADWATER
JEFFERSON CITY
TOWNSEND
BROADWATER COUNTY S. C. D.
BOULDER
0330
TOSTON
0545
JEFFERSON
JEFFERSON VALLEY S. C. D.
MONTANA
VII
THREE RIVERS S.C.D.
SCALE 10 0 10 20 30 40 MILES
USDA-SCS-LINCOLN, NEBR. 1990



5,L-16,400.2

# WATER SUPPLY FORECASTS

## AS OF MARCH 1, 1961 - WATERSHED VII

(1000 Acre Feet)

| FORECAST POINT NO. | FORECAST POINT NAME | FORECAST PERIOD | FORECAST THIS YEAR | % NORMAL | MEASURED LAST YEAR | MEASURED NORMAL |
|---|---|---|---|---|---|---|
| | MISSOURI RIVER | | | | | |
| 0545 | Toston (at) (3) | Apr-Sept | 1729 | 74 | 1774 | 2342 |
| | | Apr-July | 1479 | 73 | 1528 | 2030 |
| 0908 | Fort Benton (at) (5) | Apr-Sept | 2591 | 72 | | 3599 |
| | | Apr-July | 2215 | 72 | | 3076 |
| 1095 | Virgelle (at) (6) | Apr-Sept | 3075 | 70 | | 4393 |
| | | Apr-July | 2662 | 70 | | 3803 |
| 1150 | Zortman (near) (6) | Apr-Sept | 3220 | 67 | | 4806 |
| | | Apr-July | 2776 | 67 | | 4143 |
| 1320 | Ft. Peck Dam (below)(7) | Apr-Sept | 3271 | 69 | | 4761 |
| | | Apr-July | 2862 | 69 | | 4181 |
| 1770 | Wolf Point (near) (7) | Apr-Sept | 3559 | 68 | | 5261 |
| | | Apr-July | 3142 | 68 | | 4652 |
| 3300 | Williston, N. D. (8) | Apr-Sept | 7567 | 60 | 6280 | 12562 |
| | | Apr-July | 6640 | 60 | 5633 | 11101 |
| | PRICKLY PEAR CREEK | | | | | |
| 0615 | Clancy (near) | Apr-Sept | 11.9 | 50 | 19.4 | 23.9 |
| | | Apr-July | 10.5 | 50 | 17.1 | 20.8 |

(3) Observed flow plus change in storage in Hebgen and Ennis Lakes.
(5) Observed flow plus change in storage in Canyon Ferry.
(6) Observed flow plus change in storage in Canyon Ferry and Tiber Reservoirs.
(7) Observed flow plus change in storage in Canyon Ferry, Tiber and Fort Peck Reservoirs.
(8) Observed flow plus change in storage in Fort Peck, Canyon Ferry, Tiber, Buffalo Bill and Boysen Reservoirs.
(+) Provisional data furnished by U. S. Geological Survey.

# RESERVOIR STORAGE DATA

## AS OF FEBRUARY 28, 1961

(1000 Acre Feet)

| NO. | RESERVOIR | USABLE CAPACITY | MEASURED THIS YEAR | MEASURED LAST YEAR | MEASURED NORMAL |
|---|---|---|---|---|---|
| 0585 | Canyon Ferry | 2043.0 | 1487.0 | 1847.0 | 1332.0 |
| 0645 | Lake Helena | 10.4 | 9.6 | 4.5 | 8.3 |
| 0660 | Holter Lake | 81.9 | 9.9 | 16.0 | 59.2 |
| 0650 | Hauser Lake & Lake Helena | 61.9 | 59.6 | 43.6 | 54.1 |
| 1315 | Fort Peck | 19410.0 | 11370.0 | 10010.0 | 11178.0 |

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

USDA-SCS-LINCOLN NEBR 1960



5,L-16,395.1

# SNOW SURVEY DATA

AS OF MARCH 1, 1961

WATERSHED VII

| SNOW COURSE | | | CURRENT INFORMATION | | | PAST RECORD | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | WATER CONTENT (Inches) | | |
| NO. | NAME | ELEVATION | DATE OF SURVEY | SNOW DEPTH (Inches) | WATER CONTENT (Inches) | LAST YEAR | AVERAGE | YEARS OF RECORD |
| 12C5 | Chessman Reservoir | 6200 | 2/27 | 1 | 0.2 | 4.1 | 4.3 | 15 |
| 10C2 | Grasshopper | 7000 | 3/1 | 5 | 0.8 | 4.1 | 4.3 | 15 |
| 10C1 | Kings Hill | 7950 | 3/1 | 32 | 6.2 | 10.6 | 11.5 | 15 |
| 12C1 | Stemple Pass | 6900 | 2/27 | 22 | 4.7 | 7.2 | 9.2 | 15 |
| 12C2 | Tenmile, Lower | 6250 | 2/26 | 14 | 3.2 | 6.0 | 6.3 | 15 |
| 12C3 | Tenmile, Middle | 6800 | 2/25 | 22 | 4.7 | 8.5 | 9.2 | 15 |
| 12C4 | Tenmile, Upper | 8000 | 2/25 | 28 | 6.5 | 11.0 | 11.9 | 15 |

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS LINCOLN NEBR 1960



5,L-16,395.2

# WATER SUPPLY OUTLOOK

## BEAVERHEAD, & JEFFERSON RIVER BASINS

## MONTANA

AS OF :
MARCH 1, 1961

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook in the Red Rock and Beaverhead River drainages is Poor, with a Fair supply anticipated for the Big Hole, Boulder and Jefferson Rivers.

Farmers who depend upon natural streamflow for irrigation should give serious consideration to planting early maturing crops, such as grains, and millet for hay. Starting new stands of hay and pasture should be deferred, as the water supply will be most critical later in the irrigation season. Those dependent upon a limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems.

Good water management and proper application will be necessary to obtain the most beneficial use of the limited water supply.

Snow survey measurements made near the first of March indicate that water stored in the snow-pack is 82 percent of last year and 62 percent of the 1943-57 average.

The April through September flow in the Red Rock River is forecast to be 77 percent of last year, or 49 percent average. The flow in the Big Hole and Jefferson River is expected to be slightly less than last year, while the Boulder River is forecast at 74 percent of last year.

Storage in Lima Reservoir is much below average.

*Report Prepared by*

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



USDA SCS LINCOLN NEBR 1960

LEGEND
13E2 SNOW SURVEY COURSE
12D2M SOIL MOISTURE STATION
13B3A AERIAL MARKER AT SNOW COURSE
0125 STREAM GAGING STATION
DRAINAGE
S. C. D. BOUNDARY
WATERSHED BOUNDARY
HIGHWAY
TOWN
COUNTY BOUNDARY
STATE BOUNDARY
LEWIS & CLARK CO. S. C. D.
12C2
12C3
12C4
12C5
91
BASIN
BOULDER
0330
12C6
JEFFERSON
13C7
DEER LODGE
15S
BUTTE
JEFFERSON VALLEY S. C. D.
THREE RIVERS S. C. D.
MILE HIGH S. C. D.
13D1
SILVER BOW
12D1
WHITEHALL
0345
15S
BIG HOLE RIVER
13D2
13D16
13D5
13D4
13D3
13D13
13D14
13D15
WISE RIVER
DIVIDE
MELROSE
JEFFERSON RIVER
TWIN BRIDGES
287
0255
GLEN
41
SHERIDAN
MADISON S.C.D.
RUBY RIVER
13D6
13D7
13D8
13D9
13D10
13D11
13D12
13E1
13E2
BEAVERHEAD
BEAVERHEAD S. C. D
ENNIS
34
VIRGINIA CITY
MADISON
RUBY VALLEY
0195
S. C. D.
DILLON
0160
12D3
0175
BEAVERHEAD RIVER
PRAIRIE CR.
ARMSTEAD
RED
ROCK CREEK
0125
0120
0110
LIMA
12E1
12E2
11E3
11E4
91
12E3
11E11
11E12
IDAHO
N
MONTANA
VIII
SCALE 10 0 10 20 30 40 MILES
USDA SCS LINCOLN NEBR 1960



5,L-16,394.2

# WATER SUPPLY FORECASTS

## AS OF MARCH 1, 1961 - WATERSHED VIII

(1000 Acre Feet)

| FORECAST POINT | | FORECAST PERIOD | FORECAST THIS YEAR | % NORMAL | MEASURED | |
|---|---|---|---|---|---|---|
| NO. | NAME | | | | LAST YEAR+ | NORMAL |
| | RED ROCK RIVER | | | | | |
| 0110 | Kennedy Ranch (at) | May-Sept | 23.5 | 43 | 27.8 | 54.9 |
| | | May-July | 21.1 | 43 | 25.5 | 49.1 |
| 0125 | Monida (near) (1) | Apr-Sept | 42.1 | 49 | 54.6 | 86.4 |
| | | Apr-July | 40.3 | 49 | 53.5 | 82.2 |
| | BEAVERHEAD RIVER | | | | | |
| 0160 | Barratts (at) (1) | Apr-Sept | No Forecast (B) | | 82.6 | 173 |
| | | Apr-July | | | 59.8 | 155 |
| | BIG HOLE RIVER | | | | | |
| 0255 | Melrose (near) | Apr-Sept | 537 | 70 | 556 | 770 |
| | | Apr-July | 491 | 69 | 513 | 714 |
| | BOULDER RIVER | | | | | |
| 0330 | Boulder (near) | Apr-Sept | 54.4 | 68 | 73.0 | 79.9 |
| | | Apr-July | 52.4 | 69 | 69.9 | 76.5 |
| | JEFFERSON RIVER | | | | | |
| 0345 | Sappington (at) | Apr-Sept | 736 | 68 | 760 | 1074 |
| | | Apr-July | 644 | 67 | 677 | 958 |

(B) Forecasts discontinued at this station because the large number of unmeasured diversions above the station determine the flow.
(1) Observed flow plus change in storage in Lima Reservoir.
(+) Provisional data furnished by U. S. Geological Survey.

# RESERVOIR STORAGE DATA

## AS OF FEBRUARY 28, 1961

(1000 Acre Feet)

| NO. | RESERVOIR | USABLE CAPACITY | MEASURED | | |
|---|---|---|---|---|---|
| | | | THIS YEAR | LAST YEAR | NORMAL |
| | Ruby | 38.8 | 21.2 | 32.0 | 21.2 (8) |
| 0120 | Lima | 84.0 | 9.4 | - | 32.8 |

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)



USDA-SCS-LINCOLN NEBR 1960

5,L-16,395.1

# SNOW SURVEY DATA

AS OF MARCH 1, 1961 — WATERSHED VIII

| SNOW COURSE | | | CURRENT INFORMATION | | | PAST RECORD | | |
|---|---|---|---|---|---|---|---|---|
| | | | DATE OF SURVEY | SNOW DEPTH (Inches) | WATER CONTENT (Inches) | WATER CONTENT (Inches) | | YEARS OF RECORD |
| NO. | NAME | ELEVATION | | | | LAST YEAR | AVERAGE | |
| 13D14 | Anderson Meadow | 7000 | 3/2 | 22 | 3.7 | 3.9 | 7.4 | 10 |
| 13D4 | Below Big Hole Pass | 6900 | 3/1 | 35 | 6.0 | 8.9 | 13.0 | 10 |
| 13D3 | Big Hole Pass | 7240 | 3/1 | 41 | 9.7 | 8.7 | 15.1 | 10 |
| 13D10 | Bloody Dick | 7600 | 2/27 | 31 | 6.2 | 7.4 | 10.3 | 10 |
| 12E3 | Camp Creek | 6800 | 2/27 | 21 | 4.5 | 7.0 | 9.2 | 15 |
| 12C5 | Chessman Reservoir | 6200 | 2/27 | 1 | 0.2 | 4.1 | 4.3 | 15 |
| 13D5 | East Boundary | 6700 | 3/1 | 16 | 3.2 | 4.7 | 7.1 | 10 |
| 13D15 | Elk Horn | 8450 | 3/1 | 27 | 5.4 | 5.7 | 9.1 | 15 |
| 13D2 | Gibbons Pass | 7100 | 2/27 | 55 | 15.4 | 14.9 | 22.2 | 15 |
| 13D9 | Gold Stone | 8100 | 2/27 | 38 | 9.1 | 9.0 | 13.1 | 10 |
| 13D8 | Jahnke Creek | 7340 | 2/27 | 28 | 5.1 | 7.0 | 9.7 | 10 |
| 11E12 | Kilgore | 6200 | 2/26 | 32 | 7.9 | 7.4 | 9.5 | 15 |
| 11E4 | Lakeview Canyon | 6930 | 2/24 | 29 | 6.1 | 7.3 | 10.2 | 10 |
| 11E3 | Lakeview Ridge | 7400 | 2/24 | 25 | 5.0 | 6.6 | 8.5 | 10 |
| 13E1 | Lemhi Pass | 7480 | 2/23 | 22 | 4.7 | 6.6 | 7.4 | 10 |
| 12E2 | Limekiln | 6950 | 2/21 | 0 | 0 | 1.8 | 1.2 | 10 |
| 13D6 | Miner Forks | 7300 | 2/28 | 39 | 8.2 | 8.2 | 10.7 | 10 |
| 13D7 | Miner Lake | 6720 | 2/28 | 25 | 5.0 | 5.7 | 7.0 | 13 |
| 13D16 | Moose Creek | 6200 | 2/27 | 40 | 10.6 | 10.8 | 16.1 | 15 |
| 12C6 | Picnic Grounds | 6500 | 3/1 | 10 | 2.3 | 2.5 | 4.7 | 11 |
| 12D1 | Pipestone Pass | 7200 | 2/20 | 11 | 3.0 | 5.5 | 4.4 | 15 |
| 13D11 | Selway Junction | 6800 | 2/22 | 24 | 3.1 | 5.4 | 7.2 | 10 |
| 13C7 | Storm Lake | 7780 | 3/2 | 38 | 9.4 | 9.2 | 11.2 | 5 |
| 12C2 | Tenmile, Lower | 6250 | 2/26 | 14 | 3.2 | 6.0 | 6.3 | 15 |
| 12C3 | Tenmile, Middle | 6800 | 2/25 | 22 | 4.9 | 8.5 | 9.2 | 15 |
| 12C4 | Tenmile, Upper | 8000 | 2/25 | 28 | 6.5 | 11.0 | 11.9 | 15 |
| 13D12 | Terrell Creek | 6650 | 2/22 | 19 | 3.3 | 2.6 | 4.3 | 10 |
| 13E2 | Trail Creek | 7090 | 2/23 | 19 | 3.7 | 6.6 | 6.7 | 10 |
| 12E1 | White Pine Ridge | 8850 | 2/21 | 16 | 3.3 | 4.0 | 4.4 | 10 |
| 13D13 | Wise River | 6300 | 3/2 | 13 | 2.3 | 3.6 | 4.9 | 10 |

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS LINCOLN NEBR 1960



5,L-16,395.2

# WATER SUPPLY OUTLOOK

## MADISON, & GALLATIN RIVER BASINS

## MONTANA

AS OF:
MARCH 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Madison and Gallatin River basins is fair to poor.

Farmers who depend upon natural streamflow for irrigation should give serious consideration to planting early maturing crops, such as grains, and millet for hay. Starting new stands of hay and pasture should be deferred, as the water supply will be most critical later in the irrigation season. Those dependent upon a limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems.

Good water management and proper application will be necessary to obtain the most beneficial use of the limited water supply.

Snow survey measurements made on or near the first of March indicate that the snow-pack on the headwaters of the two basins is 120 percent of last year and 78 percent average.

Two new snow courses have been established on Jack Creek and North Meadow Creek in the lower Madison; measurements indicate a deficient snow-pack in this area.

The Madison River is forecast to flow about 5 percent more water this year than last year for the April through September period. The West Gallatin is expected to flow about 6 percent less than last year or 35 percent average. The most severe shortage in the Madison-Gallatin area is expected to occur on the East Gallatin, where the April through September streamflow is forecast to be 40 percent less than last year or 57 percent average.

Soil moisture conditions have improved in the valleys, but soils underlying the snow-pack are dry.

*Report Prepared by*

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



USDA-SCS LINCOLN NEBR 1960

5,L-16,521.1

USDA-SCS-LINCOLN, NEBR. 1966

5,L-16,521.2

# WATER SUPPLY FORECASTS

## AS OF MARCH 1, 1961 - WATERSHED IX

(1000 Acre Feet)

| FORECAST POINT | | FORECAST PERIOD | FORECAST THIS YEAR | % NORMAL | MEASURED | |
|---|---|---|---|---|---|---|
| NO. | NAME | | | | LAST YEAR+ | NORMAL |
| | MADISON RIVER | | | | | |
| 0375 | West Yellowstone (nr) | Apr-Sept | 182 | 84 | 171 | 216 |
| | | Apr-July | 137 | 83 | 128 | 165 |
| 0385 | Grayling (near) (2) | Apr-Sept | 377 | 84 | 327 | 448 |
| | | Apr-July | 296 | 83 | 247 | 357 |
| 0410 | McAllister (near) (3) | Apr-Sept | 652 | 86 | 620 | 756 |
| | | Apr-July | 524 | 85 | 480 | 613 |
| | WEST GALLATIN RIVER | | | | | |
| 0435 | Gateway (near) | Apr-Sept | 389 | 85 | 416 | 459 |
| | | Apr-July | 336 | 85 | 353 | 395 |
| 0500 | Hyalite Cr. R.S.(at) (4) | Apr-Sept | 30.6 | 85 | 35.4 | 36.1 |
| | | Apr-July | 26.4 | 85 | 30.6 | 31.0 |
| | EAST GALLATIN RIVER | | | | | |
| 0480 | Bozeman (at) | Apr-Sept | 26.5 | 57 | 42.7 | 46.4 |
| | | Apr-July | 23.2 | 57 | 36.9 | 40.7 |
| | GALLATIN RIVER | | | | | |
| 0525 | Logan (at) | Apr-Sept | 384 | 78 | 420 | 492 |
| | | Apr-July | 325 | 77 | 352 | 422 |

(2) Observed flow plus change in storage in Hebgen Lake.
(3) Observed flow plus change in storage in Hebgen and Ennis Lakes.
(4) Observed flow plus change in storage in Hyalite Reservoir.
(+) Provisional data furnished by U. S. Geological Survey.

# RESERVOIR STORAGE DATA

## AS OF FEBRUARY 28, 1961

(1000 Acre Feet)

| NO. | RESERVOIR | USABLE CAPACITY | MEASURED | | |
|---|---|---|---|---|---|
| | | | THIS YEAR | LAST YEAR | NORMAL |
| 0380 | Hebgen Lake | 345.0 | 133.7 | 25.8 | 213.9 |
| 0405 | Ennis Lake | 41.0 | 39.0 | 37.7 | 35.9 |
| 0500 | Middle Creek | 8.0 | | 4.2 | 3.6 |

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)



USDA-SCS-LINCOLN NEBR 1960

5,L-16,395.1

# SNOW SURVEY DATA

AS OF MARCH 1, 1961

WATERSHED IX

| SNOW COURSE NO. | SNOW COURSE NAME | ELEVATION | CURRENT INFORMATION: DATE OF SURVEY | CURRENT INFORMATION: SNOW DEPTH (Inches) | CURRENT INFORMATION: WATER CONTENT (Inches) | PAST RECORD: WATER CONTENT (Inches): LAST YEAR | PAST RECORD: WATER CONTENT (Inches): AVERAGE | PAST RECORD: YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|
| 11E9 | Big Springs | 6500 | 2/26 | 53 | 16.5 | 10.0 | 20.4 | 15 |
| 10D4 | Devil's Slide | 8100 | 3/2 | 55 | 14.4 | 19.0 | 16.3 | 15 |
| 11E5 | Hebgen | 6550 | 2/27 | 37 | 8.1 | 7.9 | 11.2 | 15 |
| 10D3 | Hood Meadow | 6600 | 3/1 | 25 | 6.2 | 7.1 | 7.2 | 15 |
| 11E10 | Island Park | 6315 | 2/25 | 45 | 12.5 | 7.9 | 15.8 | 15 |
| 11D5 | Jack Creek | 7600 | 2/17 | 6 | 1.1 | - | - | - |
| 10D1 | New World | 6700 | 2/25 | 24 | 6.6 | 8.8 | 8.7 | 14 |
| 10E2 | Norris Basin | 7500 | 2/28 | 34 | 7.5 | 4.0 | 9.4 | 10 |
| 11D3 | North Meadow | 7500 | 2/17 | 23 | 4.8 | - | - | - |
| 10D10 | Sacajawea | 6550 | 2/27 | 29 | 7.6 | 12.5 | - | - |
| 11E6 | Twenty-One Mile | 7150 | 2/27 | 47 | 12.3 | 8.8 | 16.0 | 15 |
| 11E8 | Valley View | 6500 | 2/26 | 39 | 10.1 | 6.9 | 12.9 | 12 |
| 11E7 | West Yellowstone | 6700 | 2/27 | 33 | 7.5 | 5.2 | 11.3 | 15 |

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS-LINCOLN NEBR 1960



5,L-16,395.2

# WATER SUPPLY OUTLOOK

## JUDITH, & MUSSELSHELL RIVER BASINS

## MONTANA

AS OF:
MARCH 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook in the Judith and Musselshell drainages is Poor.

Farmers who depend upon natural streamflow for irrigation should give serious consideration to planting early maturing crops, such as grains and millet for hay. Starting new stands of hay and pasture should be deferred, as the water supply may be most critical later in the irrigation season. Those dependent upon a limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems.

Snow surveys made near the first of March indicate the snow-pack is 53 percent of last year and 51 percent of the 1943-57 average.

Soil moisture underlying the snow-pack is below average and will have a significant effect on the spring and summer streamflow.

The South Fork of the Musselshell above Martinsdale is expected to flow 60 percent of average during the April through September period. This is slightly more than last year's flow.

Other streams and creeks in this area are expected to follow much the same pattern of below-normal streamflow.

*Report Prepared by*

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



USDA SCS LINCOLN NEBR 1960

5,L-16,516.1

USDA-SCS-LINCOLN NEBR. 1960



5,L-16,516.2

# WATER SUPPLY FORECASTS

## AS OF MARCH 1, 1961 - WATERSHED X

(1000 Acre Feet)

| FORECAST POINT NO. | FORECAST POINT NAME | FORECAST PERIOD | FORECAST THIS YEAR | % NORMAL | MEASURED LAST YEAR | MEASURED + NORMAL |
|---|---|---|---|---|---|---|
| | MUSSELSHELL RIVER | | | | | |
| | South Fork | | | | | |
| 1185 | Martinsdale (above) | Apr-Sept | 32.2 | 60 | 31.5 | 53.6 |
| | | Apr-July | 30.8 | 60 | 29.9 | 51.4 |
| 1205 | Harlowton (at) (9) | Apr-Sept | 48.1 | 58 | | 83.0 |
| | | Apr-July | 47.6 | 58 | | 82.0 |
| | MISSOURI RIVER | | | | | |
| 1095 | Virgelle (at) (6) | Apr-Sept | 3075 | 70 | | 4393 |
| | | Apr-July | 2662 | 70 | | 3803 |
| 1150 | Zortman (near) (6) | Apr-Sept | 3220 | 67 | | 4806 |
| | | Apr-July | 2776 | 67 | | 4143 |

(6) Observed flow plus change in storage in Canyon Ferry and Tiber Reservoirs.
(9) Observed flow plus change in storage in Durand and Martinsdale Reservoirs.
(+) Provisional data furnished by U. S. Geological Survey.

# RESERVOIR STORAGE DATA

## AS OF FEBRUARY 28, 1961

(1000 Acre Feet)

| NO. | RESERVOIR | USABLE CAPACITY | MEASURED THIS YEAR | MEASURED LAST YEAR | MEASURED NORMAL |
|---|---|---|---|---|---|
| 1190 | Martinsdale | 23.1 | | 6.3 | 9.8 |
| 1165 | Durand | 7.0 | | 4.6 | 4.9 |
| 1105 | Ackley | 5.8 | 4.1 | 4.1 | 4.2 |

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF

MARCH 1, 1961

WATERSHED X

| SNOW COURSE | | | CURRENT INFORMATION | | | PAST RECORD | | |
|---|---|---|---|---|---|---|---|---|
| | | | DATE OF SURVEY | SNOW DEPTH (Inches) | WATER CONTENT (Inches) | WATER CONTENT (Inches) | | YEARS OF RECORD |
| NO. | NAME | ELEVATION | | | | LAST YEAR | AVERAGE | |
| 10C5 | Bald Ridge | 7500 | 2/28 | 31 | 7.6 | - | - | - |
| 9C1 | Crystal Lake | 6100 | 3/1 | 21 | 7.0 | 11.4 | 9.9 | 15 |
| 10C2 | Grasshopper | 7000 | 3/1 | 5 | 0.8 | 4.1 | 4.3 | 15 |
| 10C1 | Kings Hill | 7950 | 3/1 | 32 | 6.2 | 10.6 | 11.5 | 15 |
| 10C3 | Porcupine | 6500 | 2/28 | 17 | 4.2 | 4.8 | 5.7 | 15 |
| 9A1 | Rocky Boy | 5200 | 3/1 | 6 | 0.2 | 3.8 | 4.8 | 15 |

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS LINCOLN NEBR 1960



5,L-16,395.2

# WATER SUPPLY OUTLOOK

## UPPER YELLOWSTONE RIVER BASIN

## MONTANA

AS OF:

MARCH 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook in the Upper Yellowstone area is Fair to Poor.

Farmers who depend upon natural streamflow for irrigation should give serious consideration to planting early maturing crops, such as grains, and millet for hay. Starting new stands of hay and pasture should be deferred, as the water supply may be most critical later in the irrigation season. Those dependent upon a limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems.

Good water management and proper application will be necessary to obtain the most beneficial use of the limited water supply.

Snow survey measurements made near the first of March indicate that water stored in the snow-pack is 116 percent of last year and 77 percent of the 1943-57 average.

Deficient soil moisture conditions underlying the light snow-pack in the Shields River drainage are expected to produce a 65 percent average April through September streamflow.

The Yellowstone River is forecast to flow slightly more water than last year. The Stillwater River, Clarks Fork River and Rock Creek are forecast to flow 10 to 30 percent more water than last year.

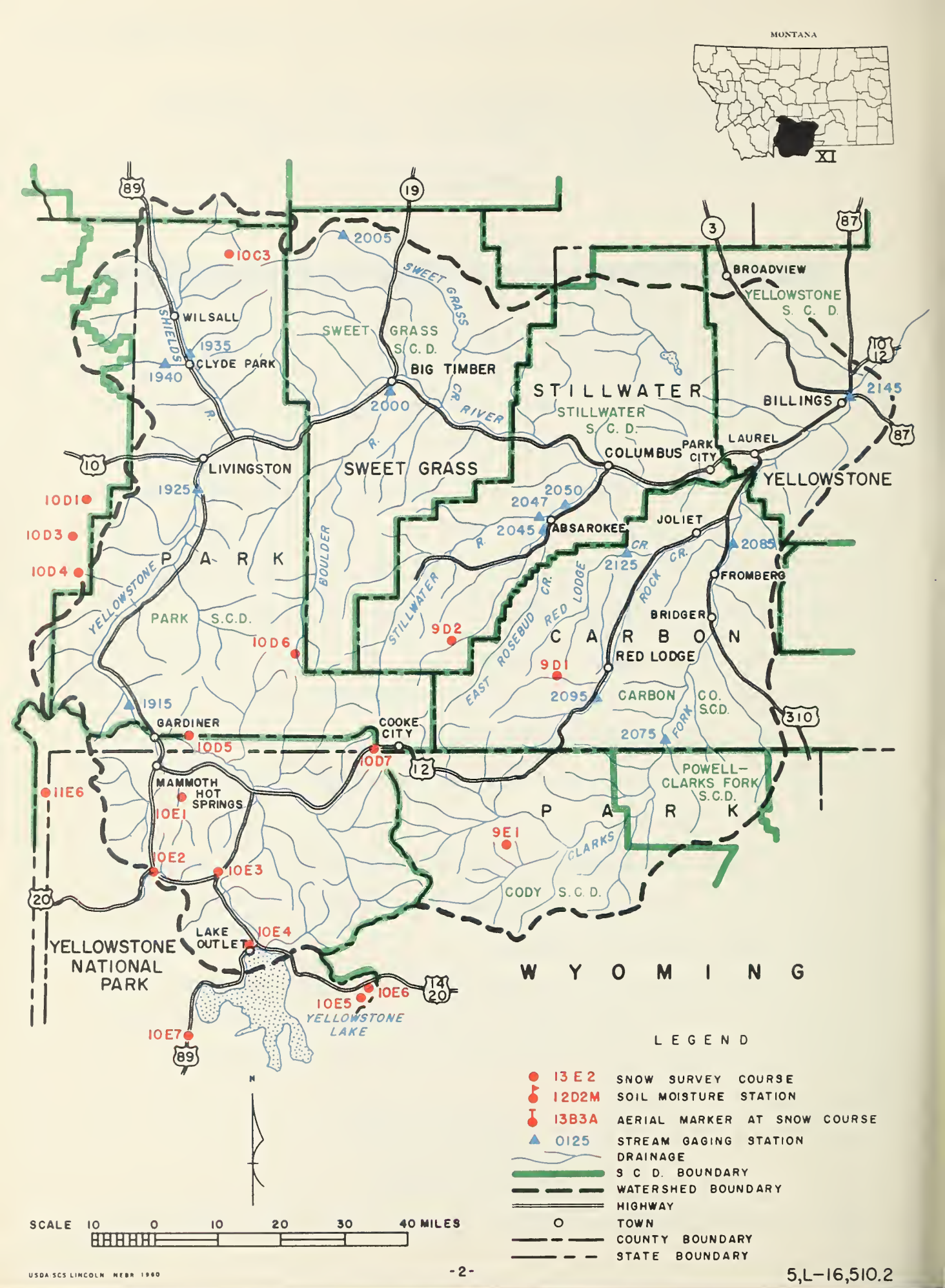
*Report Prepared by*

A. R. CODD AND P. E. FARNES
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



USDA SCS LINCOLN NEBR 1960




USDA SCS LINCOLN NEBR 1960



5,L-16,510.2

# WATER SUPPLY FORECASTS

## AS OF MARCH 1, 1961 - WATERSHED XI

(1000 Acre Feet)

| FORECAST POINT NO. | FORECAST POINT NAME | FORECAST PERIOD | FORECAST THIS YEAR | % NORMAL | MEASURED LAST YEAR+ | MEASURED NORMAL |
|---|---|---|---|---|---|---|
| | YELLOWSTONE RIVER | | | | | |
| 1915 | Corwin Springs (at) | Apr-Sept | 1518 | 77 | 1322 | 1980 |
| | | Apr-July | 1240 | 75 | 1108 | 1649 |
| 1925 | Livingston (near) | Apr-Sept | 1713 | 76 | 1527 | 2252 |
| | | Apr-July | 1383 | 74 | 1273 | 1863 |
| 2145 | Billings (at) | Apr-Sept | 2983 | 70 | 2526 | 4261 |
| | | Apr-July | 2560 | 70 | 2176 | 3657 |
| 3090 | Miles City (at) (13) | Apr-Sept | 3898 | 58 | 2897 | 6721 |
| | | Apr-July | 3412 | 58 | 2569 | 5883 |
| 3295 | Sidney (near) (13) | Apr-Sept | 3737 | 54 | 2675 | 6921 |
| | | Apr-July | 3314 | 54 | 2473 | 6137 |
| | SHIELDS RIVER | | | | | |
| 1935 | Clyde Park (at) | Apr-Sept | 72.4 | 65 | 63.4 | 111 |
| | | Apr-July | 66.9 | 65 | 58.7 | 103 |
| | ROSEBUD CREEK | | | | | |
| 2045 | Absarokee (near) (12) | Apr-Sept | 182 | 68 | 131 | 267 |
| | | Apr-July | 147 | 68 | 107 | 216 |
| | STILLWATER RIVER | | | | | |
| 2050 | Absarokee (near) (12) | Apr-Sept | 432 | 70 | 332 | 620 |
| | | Apr-July | 366 | 70 | 279 | 523 |
| | CLARKS FORK RIVER | | | | | |
| 2075 | Chance (at) | Apr-Sept | 495 | 80 | | 617 |
| | | Apr-July | 441 | 80 | | 552 |
| 2085 | Edgar (at) | Apr-Sept | 515 | 79 | | 652 |
| | | Apr-July | 454 | 79 | | 575 |
| | ROCK CREEK | | | | | |
| 2095 | Red Lodge (near) | Apr-Sept | 83.5 | 75 | 70.6 | 112 |
| | | Apr-July | 64.4 | 75 | 51.9 | 86.3 |

(12) Observed flow plus change in storage in Mystic Lake.
(13) Observed flow plus change in storage in Buffalo Bill & Boysen Reservoirs.
(+) Provisional data furnished by U. S. Geological Survey.

# RESERVOIR STORAGE DATA

## AS OF FEBRUARY 28, 1961

(1000 Acre Feet)

| NO. | RESERVOIR | USABLE CAPACITY | MEASURED THIS YEAR | MEASURED LAST YEAR | MEASURED NORMAL |
|---|---|---|---|---|---|
| 2040 | Mystic Lake | 20.8 | 8.0 | 6.1 | 8.6 |

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF MARCH 1, 1961

WATERSHED XI

| SNOW COURSE NO. | SNOW COURSE NAME | ELEVATION | CURRENT INFORMATION: DATE OF SURVEY | CURRENT INFORMATION: SNOW DEPTH (Inches) | CURRENT INFORMATION: WATER CONTENT (Inches) | PAST RECORD: WATER CONTENT (Inches) LAST YEAR | PAST RECORD: WATER CONTENT (Inches) AVERAGE | YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|
| 10C5 | Bald Ridge | 7500 | 2/28 | 31 | 7.6 | - | - | - |
| 9D1 | Camp Senia | 7890 | 2/23 | 12 | 2.3 | 3.6 | 6.0 | 7 |
| 10E3 | Canyon | 7500 | 2/28 | 44 | 10.1 | 7.4 | 12.7 | 13 |
| 10D7 | Cooke City | 7400 | 3/1 | 26 | 5.5 | 4.2 | 7.8 | 15 |
| 10D5 | Crevice Mountain | 8400 | 3/1 | 22 | 4.8 | 4.4 | 8.2 | 15 |
| 10D4 | Devil's Slide | 8100 | 3/2 | 55 | 14.4 | 19.0 | 16.3 | 15 |
| 10E6 | East Entrance | 7000 | 2/28 | 33 | 7.5 | 5.3 | 10.8 | 9 |
| 10D3 | Hood Meadow | 6600 | 3/1 | 25 | 6.2 | 7.1 | 7.2 | 15 |
| 10E4 | Lake Camp #1 | 7850 | 2/28 | 34 | 6.8 | 4.8 | 9.3 | 13 |
| 9E1 | Lodgepole | 8200 | 3/1 | 27 | 5.8 | 5.0 | - | - |
| 10E1 | Lupine Creek | 7300 | 2/28 | 31 | 7.5 | 5.6 | 9.7 | 14 |
| 10D1 | New World | 6700 | 2/25 | 24 | 6.6 | 8.8 | 8.7 | 14 |
| 10E2 | Norris Basin | 7500 | 2/28 | 34 | 7.5 | 4.0 | 8.6 | 10 |
| 10C3 | Porcupine | 6500 | 2/28 | 17 | 4.2 | 4.8 | 5.7 | 15 |
| 10D10 | Sacajawea | 6550 | 2/27 | 29 | 7.6 | 12.5 | - | - |
| 10E5 | Sylvan Pass | 7100 | 3/1 | 43 | 9.5 | 7.6 | 13.1 | 14 |
| 10E7 | Thumb Divide | 7900 | 2/25 | 54 | 13.5 | 10.3 | 21.2 | 15 |

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS-LINCOLN NEBR 1960



5,L-16,395.2

## STATUS OF RESERVOIR STORAGE

February 28, 1961

| BASIN & STREAM | RESERVOIR | USABLE CAPACITY 1000 A.F. | USABLE STORAGE - 1000 ACRE FEET | | | |
|---|---|---|---|---|---|---|
| | | | 1961 | 1960 | 1943-57 Average | Years Record Used |
| MISSOURI RIVER BASIN - WYOMING | | | | | | |
| Shoshone River | Buffalo Bill | 372.5 | 129.6 | 122.5 | 235.4 | 15 |
| Wind River | Boysen | 560.0AC | 98.1 | 140.5 | 250.6** | 5 |
| Wind River | Pilot Butte | 31.6 | 13.5 | 15.9 | 13.3 | 15 |
| Bull Creek | Bull Lake | 152.0 | 57.9 | 37.8 | 63.2 | 15 |
| Belle Fourche | Key Hole | 190.3AC | 3.8 | 0.0 | 10.9** | 5 |
| MISSOURI RIVER BASIN - NORTH DAKOTA | | | | | | |
| Heart River | Lake Tschida | 68.7AC | 48.3 | 43.5 | 53.1** | 7 |
| Heart River | E. A. Patterson | 5.6AC | 3.5 | 4.0 | 3.8** | 6 |
| Missouri River | Garrison Lake | 18100.0AC | 4988.0 | 3563.2 | - | - |
| James River | Jamestown | 20.0AC | 15.6 | 8.1 | - | - |
| MISSOURI RIVER BASIN - SOUTH DAKOTA | | | | | | |
| Belle Fourche | Belle Fourche | 185.2AC | 29.3 | 34.3 | 106.8 | 15 |
| Cheyenne River | Angostura | 90.0AC | 4.7 | 19.2 | 41.4** | 6 |
| Cheyenne River | Deerfield | 15.1AC | 2.5 | 1.2 | 12.9** | 10 |
| Grand River | Shadehill | 84.0AC | 50.2 | 69.0 | 76.4** | 5 |
| Missouri River | Ft. Randall | 3800.0AC | 2516.0 | 2452.5 | 1376.3** | 3 |
| Missouri River | Gavins Point | 320.0AC | 233.0 | 313.1 | - | - |
| Missouri River | Oahe | 17000.0AC | 1836.0T | 994.0T | - | - |
| Cheyenne River | Pactola | 55.0AC | 15.9 | 24.1 | - | - |

** Average for years of record shown in 1943-57 base period.
AC Active Capacity; USBR Billings.
T Total Storage.

## WYOMING SNOW SURVEYS ABOUT MARCH 1, 1961

| No. | Snow Course Name | Elev. | Current Information: Date of Survey | Snow Depth (In.) | Water Content (In.) | Past Record Water Content (In.): Last Year | 15-Year Average 1943-57 | Years Record Used in Average |
|---|---|---|---|---|---|---|---|---|
| **LOWER YELLOWSTONE - WIND RIVER** | | | | | | | | |
| 9F12 | Big Warm | 8800 | 2/24 | 22 | 4.7 | 5.0 | 6.8** | 6 |
| 9F4 | Burroughs Creek | 8800 | 2/26 | 34 | 7.0 | 6.0 | 12.8** | 12 |
| 9F10 | Dinwoodie | 10000 | 2/27 | 29 | 6.1 | 8.0 | 10.6** | 12 |
| 9F17 | Dinwoodie Glaciers | 10500 | 3/1 | 30 | 6.0E | N.R. | | 1 |
| 9F9 | Dry Creek | 9500 | 2/27 | 17 | 3.1 | 3.7 | 5.6** | 12 |
| 9F6 | DuNoir | 8750 | 2/24 | 17 | 3.0 | 4.1 | 7.8 | 20 |
| 9F7 | Geyser Creek | 8500 | 2/25 | 17 | 3.2 | 4.0 | 6.8** | 12 |
| 9F8 | Little Warm | 9500 | 2/25 | 43 | 9.5 | 10.7 | 14.4** | 12 |
| 9F14 | Sheridan R.S. #2 | 7500 | 2/23 | 18 | 2.2 | 3.7 | 5.7** | 6 |
| 9F3 | T-Cross Ranch | 8000 | 2/26 | 17 | 3.3 | 3.1 | 6.8 | 20 |
| #10F9 | Togwotee Pass | 9600 | 2/27 | 67 | 19.0 | 19.1 | 25.7** | 11 |
| #9G7 | Twenty Lakes | 10[illegible]00 | No Report | | | N.R. | | 1 |
| **LOWER YELLOWSTONE - POPO AGIE RIVER** | | | | | | | | |
| 8G2 | Blue Ridge | 9500 | 2/20 | 22 | 4.2 | 5.3 | 11.2* | 21 |
| 8G5 | Bruce's Camp | 6500 | 2/22 | 15 | 2.8 | 2.9 | | 3 |
| 9G3 | Hobbs Park | 10000 | 3/1 | 40 | 10.6 | 11.3 | 15.4** | 12 |
| 9G4 | Mosquito Park R.S. | 9500 | 3/1 | 22 | 4.3 | 5.8 | 7.1* | 17 |
| 8G1 | Sawmill Glade | 8500 | 2/21 | 22 | 4.3 | 4.7 | 6.9 | 21 |
| #8G3 | South Pass | 9000 | 2/20 | 26 | 5.7 | 7.1 | 13.2 | 21 |
| 9F11 | St. Lawrence R.S. | 9000 | 2/28 | 16 | 3.3 | 3.8 | 6.1* | 17 |
| 9G2 | Trout Creek | 8400 | 3/1 | 22 | 4.4 | 5.6 | 5.1** | 12 |
| #9G7 | Twenty Lakes | 10000 | No Report | | | N.R. | | 1 |
| **LOWER YELLOWSTONE - OWL CREEK** | | | | | | | | |
| #9F19 | Kirwin | 11000 | 3/4 | 25 | 5.5E | 13.5E | | |
| 8F1 | Owl Creek | 8700 | 2/23 | 28 | 5.7 | 6.9 | 4.8** | 12 |
| **LOWER YELLOWSTONE - GREYBULL RIVER** | | | | | | | | |
| 9E6 | Frontier Needle | 10000 | 3/4 | 24 | 5.5E | | | |
| #9F19 | Kirwin | 11000 | 3/4 | 25 | 5.5E | 13.5E | | |
| 9E3 | Timber Creek #2 | 8800 | 2/28 | 11 | 2.2 | N.R. | 2.5** | 6 |
| 9E1 | Wood River #2 | 8000 | 2/27 | 19 | 4.4 | N.R. | 4.0** | 6 |

* Average for years of record shown in 1943-57 base period.
** Average of all past data. - E Estimated water content.
# Adjacent drainage.

## WYOMING SNOW SURVEYS ABOUT MARCH 1, 1961

| No. | Snow Course Name | Elev. | Current Information: Date of Survey | Snow Depth (In.) | Water Content (In.) | Past Record Water Content (In.): Last Year | 15-Year Average 1943-57 | Years Record Used in Average |
|---|---|---|---|---|---|---|---|---|
| **LOWER YELLOWSTONE - SHOSHONE RIVER** | | | | | | | | |
| 9E4 | Carter Mountain | 7800 | 3/1 | 13 | 3.2 | 4.2 | | 4 |
| 10E6 | East Entrance | 7000 | 2/28 | 33 | 7.5 | 5.3 | 10.8** | 12 |
| 9E5 | Ishawooa Cone | 9200 | | No Report | | 24.0E | | 1 |
| 10E5 | Sylvan Pass | 7100 | 3/1 | 43 | 9.5 | 7.6 | 13.1* | 17 |
| 10F9 | Togwotee Pass | 9600 | 2/27 | 67 | 19.0 | 19.1 | 25.7** | 11 |
| 9F18 | Younts Peak | 8500 | | No Report | | 26.0E | | |
| **LOWER YELLOWSTONE - NOWOOD CREEK** | | | | | | | | |
| #7F1 | Bear Trap | 8000 | 3/2 | 29 | 6.7 | 4.1 | | 1 |
| #7F2 | Canyon Creek | 7400 | 3/3 | 36 | 9.3 | 8.7 | | 1 |
| 7E25 | Cold Springs Camp | 8700 | 2/24 | 22 | 4.8 | 4.9 | | 4 |
| 7E24 | Medicine Lodge Lks. | 9500 | 2/24 | 30 | 7.6 | 8.0 | | 4 |
| #7E8 | Munkres Pass | 9700 | 3/1 | 26 | 5.5 | 6.8 | 7.5** | 6 |
| #7E27 | Onion Gulch | 8100 | 3/2 | 27 | 5.2 | 5.2 | | 4 |
| 7E35 | Tyrell R.S. | 8300 | 3/2 | 28 | 5.1 | N.R. | | 3 |
| 7E26 | West Tensleep | 9075 | 2/27 | 36 | 8.0E | 9.5E | | 4 |
| **LOWER YELLOWSTONE - SHELL CREEK** | | | | | | | | |
| #7E21 | Bald Mountain | 9600 | 2/23 | 56 | 14.8 | 17.6 | 16.2** | 5 |
| #7E20 | Beaver Tongue | 9200 | 2/23 | 52 | 13.0 | 16.3 | 15.9** | 5 |
| #7E18 | Bone Spring | 9200 | 2/27 | 44 | 12.0E | 13.0E | 13.9** | 5 |
| 7E22 | Granite Cr. Camp | 7800 | 2/25 | 6 | 1.9 | N.R. | 4.5** | 5 |
| #7E17 | Granite Pass | 8950 | 2/25 | 44 | 12.0 | 13.2 | 13.0** | 5 |
| 7E4 | Ranger Creek | 8800 | 2/25 | 25 | 4.8 | N.R. | 7.4** | 5 |
| 7E23 | Shell Creek | 9600 | 2/27 | 39 | 10.0E | 12.5E | | 4 |

* Average for years of record shown in 1943-57 base period.
** Average of all past data. - E Estimated water content.
\# Adjacent drainage.

## WYOMING SNOW SURVEYS ABOUT MARCH 1, 1961

| No. | Snow Course Name | Elev. | Current Information | | | Past Record | | Years Record Used in Average |
|---|---|---|---|---|---|---|---|---|
| | | | Date of Survey | Snow Depth (In.) | Water Content (In.) | Water Content (In.) Last Year | Water Content (In.) 15-Year Average 1943-57 | |
| **LOWER YELLOWSTONE - PORCUPINE CREEK** | | | | | | | | |
| 7E31 | Five Springs Falls | 7500 | 3/1 | 16 | 3.8 | 5.4 | 5.7** | 5 |
| #7E30 | Medicine Wheel | 9000 | 2/24 | 45 | 11.6 | 15.2 | 13.5** | 5 |
| **LOWER YELLOWSTONE - TONGUE RIVER** | | | | | | | | |
| #7E20 | Beaver Tongue | 9200 | 2/23 | 52 | 13.0 | 16.3 | 15.9** | 5 |
| 7E32 | Big Goose #2 | 7700 | 2/27 | 28 | 6.5 | 6.6 | 6.0** | 5 |
| #7E18 | Bone Spring | 9200 | 2/27 | 44 | 12.0E | 13.0E | 13.9** | 5 |
| 7E33 | Burgess R.S. #2 | 7900 | 2/24 | 26 | 5.3 | 7.6 | 6.3** | 5 |
| 7E34 | Dome Lake #2 | 8800 | 2/27 | 35 | 8.0E | 7.5E | 7.5** | 5 |
| 7E14 | Gloom Creek | 9300 | 2/27 | 47 | 13.0E | 13.0E | 10.6** | 5 |
| #7E17 | Granite Pass | 8950 | 2/25 | 44 | 12.0 | 13.2 | 13.0** | 5 |
| 7E11 | Sibley Lake | 8000 | 2/25 | 35 | 8.2 | 9.2 | 8.3** | 5 |
| 7E10 | Steamboat Point | 7500 | 2/25 | 25 | 5.7 | 7.6 | 6.1** | 5 |
| 7E12 | Sucker Creek | 9000 | 2/27 | 41 | 11.0E | 12.5E | 9.9** | 5 |
| 7E13 | Wood Rock G.S. | 8500 | 2/25 | 34 | 7.4 | 9.3 | 8.5** | 5 |
| **LOWER YELLOWSTONE - POWDER RIVER** | | | | | | | | |
| #7F1 | Bear Trap | 8000 | 3/2 | 29 | 6.7 | 4.1 | | 1 |
| #7F2 | Canyon Creek | 7400 | 3/3 | 36 | 9.3 | 8.7 | | 1 |
| 7E36 | Cloud's Peak | 10000 | 2/27 | 39 | 10.0E | 7.5E | | 1 |
| #7E28 | Muddy Creek G.S. | 7800 | 2/28 | 19 | 3.9 | 3.4 | | 4 |
| #7E8 | Munkres Pass | 9700 | 3/1 | 26 | 5.5 | 6.8 | 7.5** | 6 |
| #7E27 | Onion Gulch | 8100 | 3/2 | 27 | 5.2 | 5.2 | | 4 |
| 7E5 | Soldier Park | 8700 | 3/1 | 15 | 3.8 | 4.3 | 4.1** | 9 |
| 7E6 | Sour Dough | 8500 | 2/28 | 24 | 5.3 | 4.1 | | 4 |

** Average of all past data.
E Estimated water content.
# Adjacent drainage.

## WYOMING STREAMFLOW FORECASTS MARCH 1, 1961

| Basin and Tributary | April 1 - September 30 Seasonal Streamflow in Thousands of Acre Feet | | | |
|---|---|---|---|---|
| | Forecast Runoff | Percent 15-Year Average | Measured Runoff 1959 | 15-Year Average 1943-57 |
| NORTH POPO AGIE | | | | |
| Milford (near) | 52 | 60 | 55 | 86* |
| LITTLE POPO AGIE | | | | |
| Lander (near) | 30 | 60 | 25 | 49* |
| WIND RIVER | | | | |
| Dubois (at) | 72 | 65 | 88 | 110* |
| SHOSHONE RIVER | | | | |
| Buffalo Bill Dam (below) (1) | 77 | 70 | 397 | 851 |

All stream data taken from observed flow records with the following exceptions:
(1) Observed flow corrected for storage in Buffalo Bill Reservoir and Heart Mountain diversion.
* Less than 15 years.

## Agencies Cooperating in Collecting Data Contained in this Bulletin

U. S. Forest Service
Region I, Missoula, Montana

U. S. Geological Survey
Helena, Montana

U. S. Army Corps of Engineers
Portland, Oregon
Seattle, Washington
Omaha, Nebraska
Riverdale, N. D.

U. S. Indian Irrigation Service
St. Ignatius, Montana

U. S. Weather Bureau
Helena, Montana

U. S. Fish & Wildlife Service
Red Rock Lakes Refuge
Monida, Montana

U. S. Bureau of Reclamation
Billings, Montana
Boise, Idaho

Montana Power Company
Butte, Montana

Agricultural Experiment Station
North Montana Branch Station
Havre, Montana

Montana State Highway Dept.
East Glacier, Montana

National Park Service
Yellowstone National Park
Glacier National Park

Montana Experiment Station
Montana State College
Bozeman, Montana

Bonneville Power Administration
Portland, Oregon

Montana State School of Forestry
Montana State University
Missoula, Montana

Soil Conservation Service
Montana, Wyoming, Idaho

Soil Conservation Districts
Montana Counties

Johnson Flying Service, Inc.
Missoula, Montana

Water Rights Branch
Dept. of Lands & Forests
Victoria, British Columbia

Department of Northern Affairs
& National Resources
Calgary, Alberta

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SOIL CONSERVATION SERVICE
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COOPERATIVE SNOW SURVEYS

Furnishes the basic data necessary for forecasting water supply for irrigation, domestic and municipal water supply, hydro-electric power generation, navigation, mining and industry

*"The Conservation of Water begins with the Snow Survey"*